TRANSACTIONS

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of
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and
OTOLARYNGOLOGY

SEPTEMBER - OCTOBER
1950

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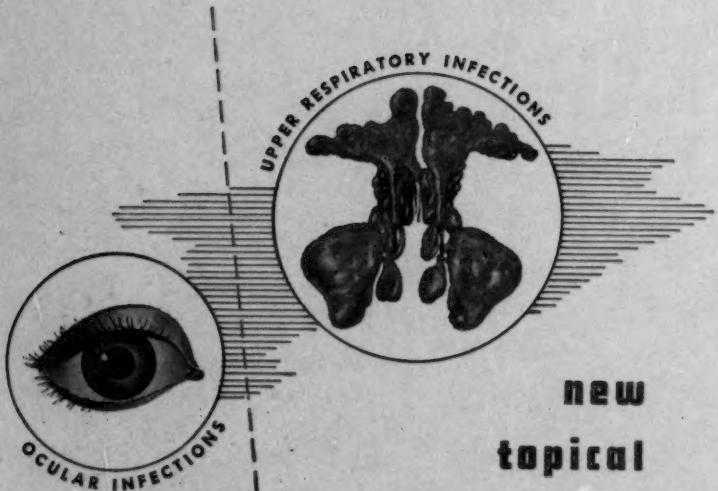
ANNUAL MEETING OCTOBER 14-19, 1951, CHICAGO



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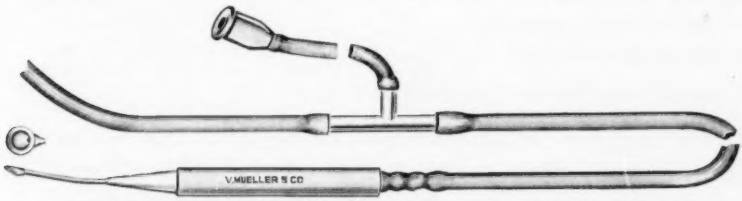

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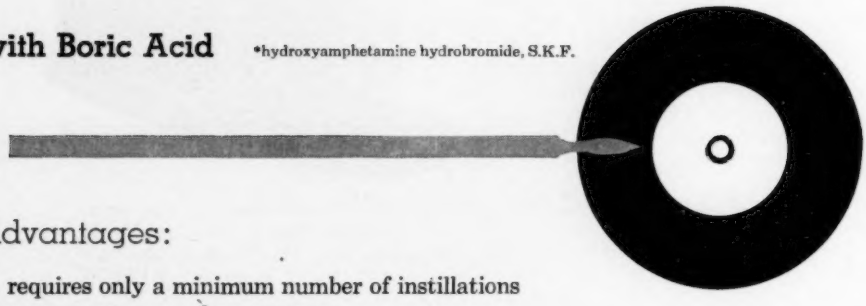

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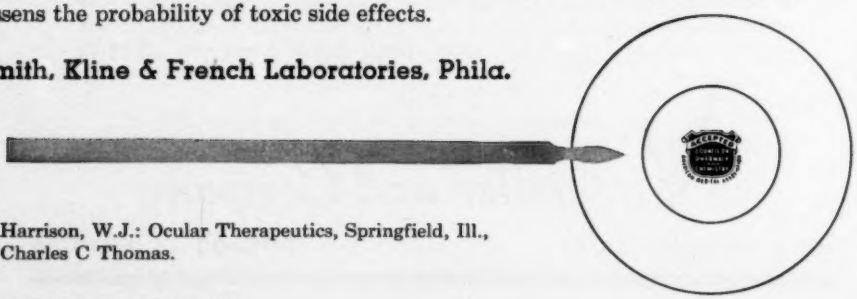

1. Harrison, W.J.: Ocular Therapeutics, Springfield, Ill., Charles C Thomas.

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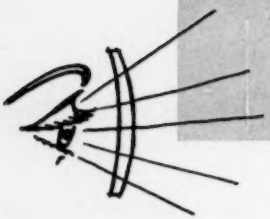

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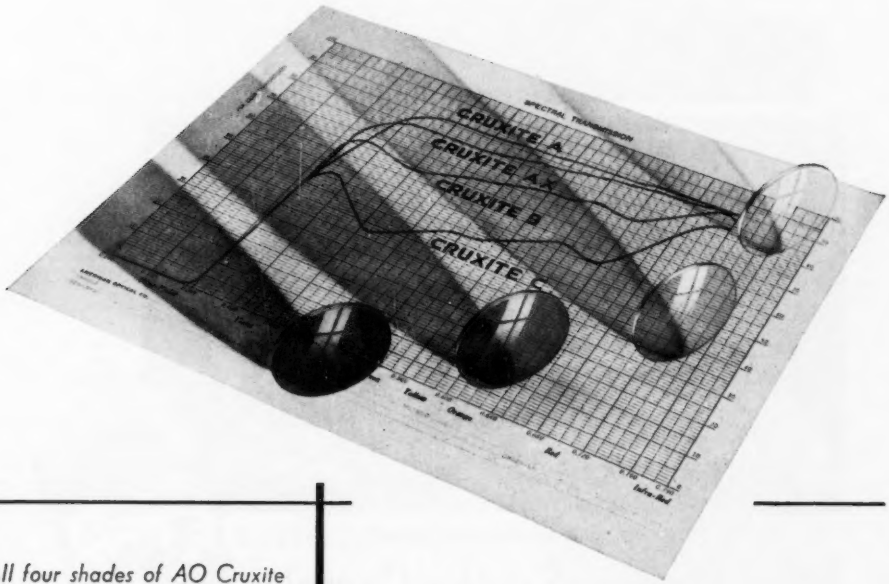

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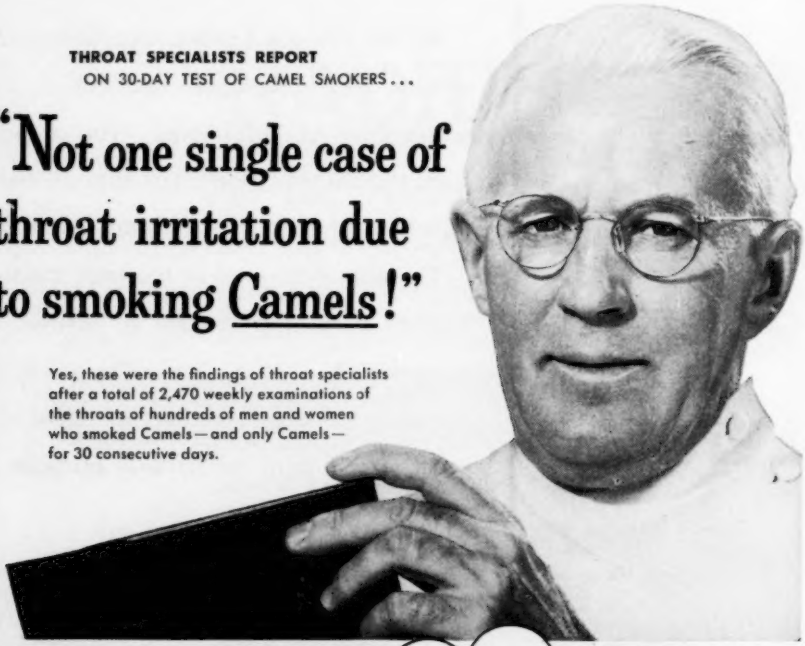

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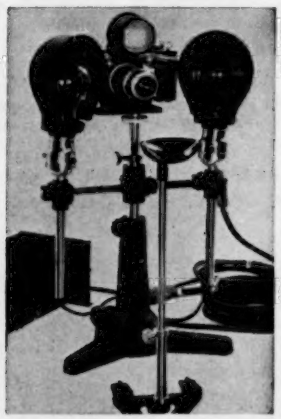

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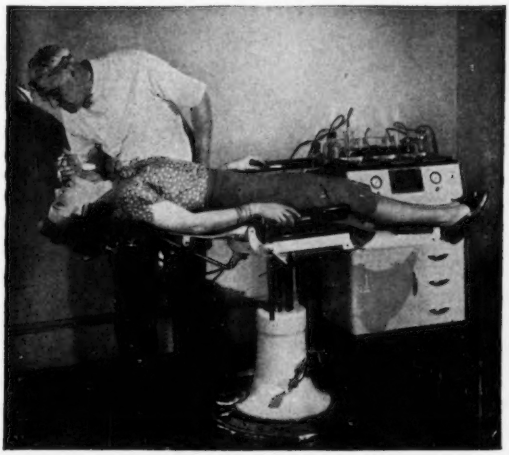

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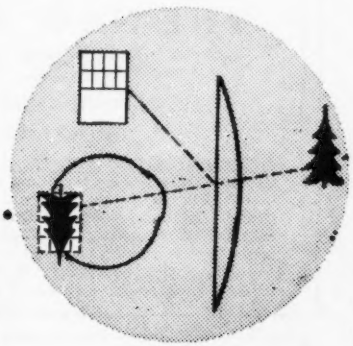

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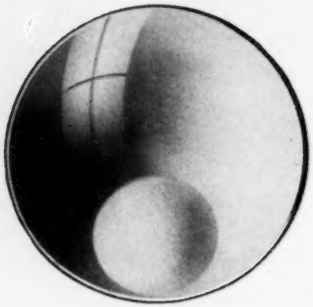

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1. Krasno, L. R., and Rhoads, P. S. (1949), The Inhalation of Penicillin Dust, Its Proper Role in the Management of Respiratory Infections, Amer. Prac., 11:649, July. **2.** Krasno, L., Karp, M., and Rhoads, P. S. (1948), Inhalation of Dust Penicillin, Ann. Int. Med., 28:607, March. **3.** Krasno, L., Karp, M., and Rhoads, P. S. (1948), The Inhalation of Penicillin Dust, J. Amer. Med. Assn., 138:344, October 2.

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of
OPHTHALMOLOGY
and
OTOLARYNGOLOGY

FIFTY-FIFTH
ANNUAL MEETING

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A HALF CENTURY OF OTOLARYNGOLOGY

JOHN MACKENZIE BROWN, M.D.
LOS ANGELES, CALIF.

I WISH to give a history of our specialty in the past half century. I should like to discuss the men whom I have known personally and from the literature who have made this possible. The roster is large and compilations are difficult. Omissions are inevitable and inadvertent — to these, my sincere apologies.

At the beginning of the twentieth century, medical specialization was in its infancy. Otology was just emerging as a medical specialty, largely because of the requirements of operative interference in mastoiditis. Among the great leaders in otology at this period were Whiting, Jack, Blake, Mosher, Dench, McKernan, Bacon, Randall, Shambaugh, Sr., Beck and Richards.

Schwartze systematized the surgical anatomy of the simple mastoidectomy, and the first complete operation of this type was probably performed by Gruening of New York.

The otology of that time was primarily concerned with suppuration. Surgical treatment of mastoiditis occupied most of the practice of the aurists of that day, many of whom were also oculists.

Mosher and Walker made many important contributions toward the safety of mastoid surgery. Dean clarified the problem of pediatric mastoiditis and its association with gastroenteritis. He also inspired Bunch to create the first practical audiometer. The studies of Ewing, Day, Friesner and Eagleton in intracranial complications were very valuable. The perfection of the radical mastoid operation is credited to Whiting, whose instruments are still used by many surgeons. Profant of Santa Barbara originated the name "petrositis" and enhanced our knowledge of this disease. Lillie of Rochester and Meltzer of Boston systematized the anatomic aspects of temporal bone surgery. One of the first and finest texts on otology was written by Kerrison.

Sterling Bunnell of San Francisco performed the first anastamosis of the facial nerve in 1927. He was followed by Robert C. Martin in 1932. Later, Sir Charles Ballance of London and Arthur Duel of New York further improved the surgical technic.

Harvey Fletcher of the Bell Telephone Laboratories, Vern Knudsen and Isaac Jones of Los Angeles made numerous original contributions in acoustic physics. The studies of Fowler, Sr., on the recruitment phenomenon and deafness are well known.

Lewy, Sonnenschein, and Macfarlan standardized hearing tests with tuning forks long before the invention of the audiometer. Lurie, Davis and Stevens of Harvard clarified auditory physiology. The discovery of the Wever-Bray phenomenon was a milestone in this field.

Stacy Guild correlated temporal bone anatomy with audiometry, and Kobrak

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demonstrated ossicular movement by motion pictures.

Early in the century, Alexander Graham Bell and G. Hudson Makuen alerted us to the problems of the deaf. Horace Newhart, Gordon Berry, Stewart Nash, Norton Canfield and Charles Kinney introduced rehabilitation methods. James Sonnet Greene pioneered in speech defects. Goldstein established the first important training center for teachers utilizing the oral method — the Central Institute for the Deaf at St. Louis.

A great advance in the half century was the development of the fenestration operation. From the early efforts of Holmgren of Sweden and Sourdille of France came the basic knowledge upon which Julius Lempert developed the one-stage endaural operation. George Shambaugh, Jr., of Chicago, and Howard House of Los Angeles have also made valuable contributions in this field.

H. Marshall Taylor stressed the effect of quinine on the auditory mechanism, and William Grove emphasized the importance of acoustic trauma in industry.

The physiologic research of McNally on the labyrinth was of great importance. Furstenberg elucidated the biochemical approach to Ménière's syndrome, and Lindsay demonstrated the pathology of hydrops. Kenneth Day developed a surgical technic for the relief of severe hydrops.

Carcinoma, tuberculosis, diphtheria and foreign bodies of the larynx emphasized the need for the development of laryngology as a specialty. Joseph O'Dwyer introduced tracheal intubation in 1894.

The first direct laryngoscopy was done by Kirstein in 1895. Upon the basis of this work, Killian developed many instruments used in laryngology, and early in the century Einhorn of New York and Ingalls of Chicago created the first distally lighted instruments.

Chevalier Jackson began his brilliant career in the field of laryngology in 1902. He made it possible for endoscopy to be done safely and efficiently, and he emphasized low tracheotomy. He undoubtedly trained more men in bronchoesophagology than any other individual. Many of his assistants became well-known laryngologists. Of these, Chevalier L. Jackson, Gabriel Tucker and Louis Clerf are actively engaged in teaching in Philadelphia.

Dr. Harris P. Mosher began his laryngologic work in 1904. He was as great in laryngology and bronchoesophagology as he was in rhinology and otology. His influence as an educator is undoubtedly the greatest in this country.

Gurdon Buck of New York performed the first successful thyrotomy in the United States in 1851, and Jacob Solis-Cohen was the first to perform a successful laryngectomy in 1868. Early in the century, the operation of laryngectomy began to gain popularity, largely through the efforts of MacKenty. Julius McCall has been prominent in the rehabilitation of the laryngectomized patient.

R. Clyde Lynch brought suspension laryngoscopy to a high plane of excellence. His work was continued by Francis LeJeune.

Thomas Halstead of Syracuse and Edwin McGinnis of Chicago were early contributors to this field.

Gordon New of the Mayo Clinic is outstanding in intralaryngeal surgery. H. B. Orton perfected the operation of lateral pharyngotomy, and Simon Jesberg added useful infant endoscopic instruments and technics in laryngeal stenosis.

The photographic methods of Paul Holinger, Francis LeJeune and Joel

Pressman advanced visual education in laryngology.

Surgery for bilateral abductor paralysis of the larynx was developed by Brian King. Other surgical procedures in abductor paralysis were developed by Joseph Kelly, Louis Clerf, Lewis Morrison and De Graaf Woodman.

The therapy of tuberculosis of the larynx was markedly improved by Levy, Spencer, and Myerson.

J. Gordon Wilson, T. H. Bast and Barry Anson have distinguished themselves by their research in anatomy and embryology of the temporal bone. Shambaugh, Sr., did original studies on the organ of Corti.

Dr. John F. Barnhill was a pioneer in anatomic studies of the head and neck. Schaeffer's anatomy of the nose and sinuses is a classic. Warren Davis, O. V. Batson, O. E. Van Alyea, and F. W. Dixon made further contributions.

George Caldwell of New York did the first canine fossa maxillary sinus operation in 1893, preceding Luc who independently described it in 1894. Pierce probably was the first to wash the antrum through the natural ostium, and Hempstead perfected the antrum window operation.

In 1904, the first recorded frontal sinus operation in this country was performed by Cornelius Coakley. Derrick Vail, Arnold Knapp, and Robert C. Lynch modified the Jansen operation. Recently, Robert Goodale, Francis Weille, Guy Boyden and Theodore Walsh have added new technics to frontal sinus surgery. Throughout this time, Mosher has rightfully insisted on the preservation of the virginity of the nasofrontal duct.

Studies on the pathology of osteomyelitis of the frontal bone and maxilla were contributed by Mosher and Furstenberg.

Our knowledge of sinus disease has been advanced by the work of Skillern, Loeb, R. B. Canfield, Leon White, Ross Faulkner, Van Alyea, F. W. Dixon, W. L. Simpson, R. F. Ridpath, E. C. Sewell, F. B. Kistner, and S. Salinger.

The submucous resection was a great impetus to rhinologic surgery. Otto Freer simplified the technics of this operation, and Ballenger, Sr., made many valuable contributions.

After a decade of radical nasal and sinus surgery, physiologic studies by Proetz revealed the need for a more conservative attitude in the treatment of sinus disease. Further original studies by Hilding on the respiratory tract are outstanding.

Many of the recent developments in the field of allergy stem from the pioneering of otolaryngologists. Early in the century, Scheppegrell and J. L. Goodale called attention to allergic rhinitis. French Hansel devised new therapeutic technics which have been adopted by both allergists and otolaryngologists. Schenck and Williams have done specific research in rhinologic allergy.

Physick is credited with the development of the first tonsil snare in 1828, and Morrell MacKenzie developed the tonsil operation, as it is now known. The pathologic studies of Emil Meyer, George Wood and George Fetterolf were real contributions to this field. William V. Mullin demonstrated lymphatic drainage of the tonsil area.

The instruments of Sluder, La Force and Beck have simplified the tonsil operation.

The intricate anatomy of the head and neck has made roentgen study of disease of this area a necessity. Among the outstanding contributors to this field are Fred Law, Alexander McMillan and Gilbert Roy Owen.

Our knowledge of ear, nose and throat pathology owes much to the efforts of Wright, Mosher, Beck, Eggston, Mueller, and Guggenheim.

Various infections of the neck spaces, together with neoplastic disease and congenital anomalies, have made our entry into this field a necessity. Barnhill will long be remembered for his pioneer studies in this area. His work has been ably continued by McCaskey. August Beck followed the lead of Mosher in clarifying many of the anatomic spaces of the neck. C. Blassingame and Colby Hall have made important contributions dealing with the fascial planes of the neck, and L. W. Dean increased our knowledge of posterior infections in this area. A. C. Furstenberg did pioneer work in salivary gland tumors and neurologic diseases of the larynx. Emil Tholen of Los Angeles has done extensive work on salivary gland tumors. Beck, Iglauer, Orton, New and Schall are well known for their head and neck neoplastic surgery.

The facilities for training in otolaryngology in the early part of the century were meager as compared to those in European schools. Since the early twenties, the facilities developed in this country for education in otolaryngology are unexcelled.

Many of our colleagues have been prominent educators. Notable among these is John D. Kernan, our honored guest. Others include Duncan MacPherson, Bryson Delavan of New York, Burt Shurly of Detroit, Norval Pierce, J. Gordon Wilson, Joseph Beck of Chicago, E. C. Sewell, A. J. Houston and H. B. Graham of San Francisco, John Foster, C. C. Cody of Houston, John Shea of Memphis, Fletcher Woodward of Virginia, Harry Lyman and W. E. Sauer of St. Louis, Francis Lederer of Chicago, G. M. Coates and Benjamin Shuster of Philadelphia, Crowe of Baltimore, Lawrence Boies of Minnesota, James Robb of Detroit, Leroy Schall of Boston, and Ralph Fenton of Portland.

The notable contributions of our British colleagues, Morrell MacKenzie, St. Clair Thomson, Herbert Tilley, Logan Turner, Norman Patterson, F. C. Ormerod, and V. E. Negus must not be forgotten.

Also to be remembered are our Canadian colleagues, Perry Goldsmith of Toronto and Herbert Birkett of Montreal.

Arthur Proetz has maintained the excellence of Hanau Loeb's editorial policy in the *Annals*. Max Goldstein in founding *Laryngoscope* did much to further journalism in this country. His work is being ably carried forward by Theodore E. Walsh. George M. Coates is carrying on the traditions and concepts of George Shambaugh, Sr., in the editorial policy of the *Archives*.

Notable is the record of our educators who have reached the unusual position of medical school deans. Among those of the past half century may be mentioned Burt R. Shurly of the Detroit College of Medicine and Surgery, A. C. Furstenberg of the University of Michigan, L. W. Dean at the University of Iowa, Hanau Loeb at St. Louis University, Edward H. Cary at Baylor University, H. S. Birkett of McGill University, Francis R. Packard at Philadelphia Polyclinic, Benjamin Church at the University of Southern California, and J. F. McKernan, president of the New York Postgraduate Medical School.

The formation of the American Board of Otolaryngology was considered by many of the leading specialists in the early 1920's. Chief among these was Shambaugh, Sr., who crystallized the matter by requesting the American Laryngological Society, the American Otological Society, the Triological Society, the Academy and our section of the American Medical Association to name two members from their lists to form the Board. The following men were appointed: T. H. Halstead, H. W. Loeb, H. P. Mosher, R. H. Skillern, Burt Shurly, Frank Spencer, T. E. Carmody,

W. P. Wherry, J. C. Beck and R. C. Lynch. The first meeting of this group was called by Shambaugh at Chicago on November 10, 1924. The Board was organized with H. P. Mosher, president; Frank Spencer, vice-president; and H. W. Loeb, secretary. The members of the Otological, Laryngological and Triological Societies were elected diplomates of the Board. The first examination was held at Philadelphia on May 26, 1925. Dr. Mosher served as president for many years. Dr. Loeb was succeeded in the secretaryship by W. P. Wherry and D. M. Lierle. The Board has been the greatest educational factor in the advancement and regulation of our specialty in the half century. The Board has my commendation for the time and energy spent on our behalf.

The founding of the Academy was indeed an auspicious event. Many individuals have given their efforts to the furtherance and growth of this organization. Time does not suffice to mention their individual and collective contributions. However, there are two who deserve special mention for their outstanding services to this society. Dr. W. P. Wherry was for many years our Executive Secretary. We are fortunate to have Dr. William L. Benedict serving full time in this position. Under their guidance the Academy has become the foremost organization of its kind in the world. The instruction at the Academy is outstanding, and the home study courses are of great educational value. The cooperation of the ophthalmologists with the otolaryngologists has made possible the accomplishments of this truly great society. I duly appreciate the great honor you have conferred upon me.

Address of the Guest of Honor

THE PATHOLOGY OF CARCINOMA OF THE LARYNX STUDIED IN SERIAL SECTIONS

JOHN DEVEREUX KERNAN, M.D.
NEW YORK, N. Y.
BY INVITATION

IT is generally agreed among laryngologists that cancers of the larynx are the most favorable for cure of all the cancers in the body. The latest large series with which I am acquainted, that of Schall of Boston, reporting on 500 cases gave the rate of cure as 65 per cent. These patients were treated both surgically and by radiation. It may be mentioned here that the surgical treatment was twice as successful as that by radiation. Although 65 per cent cured appears to be favorable, we must remember that the 35 per cent not cured are 100 per cent dead. For this reason it appears to me that an intensive study of the unsuccessful cases should be made.

I am quite aware that it is unpleasant to report failures, and I share equally with all other surgeons the reluctance to report these cases. Yet I am going to report a failure of which I made a very thorough study in the hope that profitable lessons may be drawn from it. This was a man 55 years old who had had attacks of hoarseness for a year and a half. He had had chronic sinusitis for the past 20 years. Both antrums were cloudy on roentgen examination, and he had had considerable treatment for his nose. I believe that the attacks of hoarseness were considered to be caused by the infection in his nose; hence, little attention had been paid to the larynx. However, the hoarseness eventually became continuous. Then the larynx was examined and a small mass was noted on the anterior two-thirds of the right vocal cord. No palpable nodes could be felt in the neck. Further examination disclosed that his teeth were in very poor condition, which is often noted in connection with cases of cancer of the larynx. The admitting surgeon made a note that laryngectomy was indicated.

The man was then admitted to the hospital on Aug. 7, 1941, for further study. This examination consisted of removal of tissue for biopsy and the taking of planigrams of the larynx at various levels. The report on the biopsy tissue showed it to be a fairly well differentiated squamous cell epithelioma. The planigrams disclosed the presence of considerable soft tissue swelling in the region of the ventricles, obliterating their outlines. The swelling appeared to be more marked on the right side than on the left and there was some displacement of the airway toward the left. There was no definite x-ray evidence of extension of a tumor mass into the subglottic region (fig. 1).

The radiotherapy department was consulted. The radiotherapy consultant thought that there was a good prognosis because (1) the tumor had grown slowly; (2) it was well differentiated; and (3) the arytenoid moved. He stated that roentgen therapy alone in car-

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FIG. 1—Microphotograph of tumor.

cinomas limited to the cord yields clinical cure in 56 per cent of cases. When the disease is not limited to the cord, this treatment yields only 19.5 per cent cures. The question here was whether or not the cancer was limited to the cord. One suspected that it was not because there was slight limitation of movement. I ask you to note well that this growth was considered to be intrinsic and of fairly limited extent. When the man was told that he had a fifty-fifty chance of cure by x-ray with the preservation of his voice, he chose to give a trial to radiotherapy.

Radiotherapy was begun August 19. On August 27 it was noted that his voice was improving and the cord moved more freely. In September a note was made that 2000 r had been given from each side of the larynx and 1350 r anteriorly. In spite of the radiotherapy, the ulceration of the cord had increased and the cord was fixed (fig. 2).

Another examination was then made with an anterior commissure laryngoscope. A small, granular, bleeding mass was revealed by this procedure. The biopsy indicated, as before, a squamous cell epithelioma. The patient was then advised to enter the hospital for a laryngectomy.

The examination of the larynx revealed a moderate amount of edema of the arytenoids and edematous vocal cords, especially the right. The edge of the right vocal cord was markedly irregular. Although on external palpation there was a feeling of fulness over the right thyroid cartilage, no enlargement of the nodes could be noted.

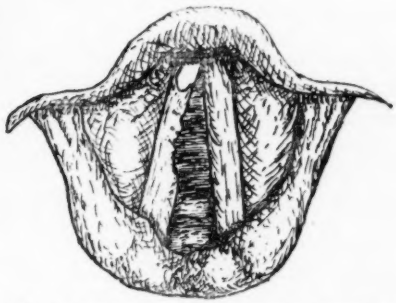

FIG. 2—Sketch of larynx at time of admission for laryngectomy.

It may be well here to summarize the notable points in the history. The man had had a sinusitis for 20 years, and his teeth were in bad condition. If chronic irritation is one of the causes of cancer, either of these conditions may well have been the source. He had had hoarseness for a year and a half when first seen. The biopsy showed a well differentiated growth. The mirror examination appeared to indicate that the disease was limited to one cord, and the planigrams showed obliteration of the right ventricle, probably due to edema and swelling of both the false and true cords. There was no evidence of disease be-

low the cords. The growth was resistant to roentgen therapy, as proved by trial.

It was felt that we had to deal with a fairly limited growth not yet extended to the glands of the neck. On this account, it was concluded that with laryngectomy the prognosis was good, and with that in mind the operation was undertaken. Total laryngectomy was carried out on October 29, two and a half months after the patient's admission to the clinic. There was no particular difficulty encountered during the operation and a good closure of the pharynx was secured. Examination of the specimen showed a growth involving the anterior two-thirds of the right vocal cord and extending into the ventricle. The larynx was apparently normal throughout the rest of its extent. It was sent intact to the department of pathology.

The postoperative course was very favorable under treatment with sulfadiazine. A note was made on November 16 that the wound had healed by first intention. The patient continued to have some pain on swallowing, but this was considered to be due to the previous radiotherapy. He was discharged as completely healed on November 26, the twenty-seventh postoperative day. For the next three months he got along very well. He developed a good pharyngeal voice and gained considerably in weight. However, at the end of three months he developed a tender firm swelling above the right clavicle and began to cough up some bloody crusts.

On March 13, 1942, the man was admitted again to the hospital and the swelling in his neck was aspirated. Most of the material aspirated was cellular debris. In several places, however, small groups of cells were seen whose characteristics were those of a malignant tumor. The patient was bronchoscoped and found to have a normal trachea. Chest roentgenograms were negative.

From this time on, the glands in the right side of the patient's neck grew rapidly. A surgical consultation was obtained with the idea that a radical neck dissection might offer a chance of cure. The surgeon consulted did not encourage this idea. The mass in the neck increased very rapidly in size until it extended from the mastoid process to the clavicle. Then, on March 26, radium needles were inserted into the glands through numerous small incisions in the skin. The patient was not disturbed by this intervention and was discharged from the hospital early in April. The total dose of radium was 5600 milligram hours. In spite of a brief period of improvement marked by a decrease in the size of the mass, in another three months the condition of the patient was worse. The swelling was greatly enlarged and had extended to the brachial plexus. At this time (October) he had severe pain which radiated to the right shoulder and down his arm. The patient had a severe attack of erysipelas about the right ear which quickly subsided under sulfadiazine treatment. Except for his pain the man continued to be in fairly good condition, but no sedatives had any effect on the pain.

A neurologic consultation was had with the idea that cutting the posterior cervical roots might relieve his suffering. This was not considered feasible by the neurologic surgeon. On November 15, the man was admitted to the hospital for the last time for terminal care and died in January, 1943, having lived for eighteen months after his first appearance in the clinic and three years after the first development of laryngeal symptoms.

We might here summarize: The patient came under our notice with a fairly advanced carcinoma of the larynx, but his was by no means considered a hopeless case. He had roentgen treatment, a laryngectomy, radium treat-

ment of cervical nodes, chemotherapy for erysipelas and, finally, terminal care. One might say that although the treatment might have been too late, it was certainly not too little.

I will ask you now to endeavor with me to arrive at an explanation of the fatal result. It may be that if the cause of the poor result in these cases is discovered, a more efficient treatment can be worked out. That is why I am urging the report of poor results rather than of good results.

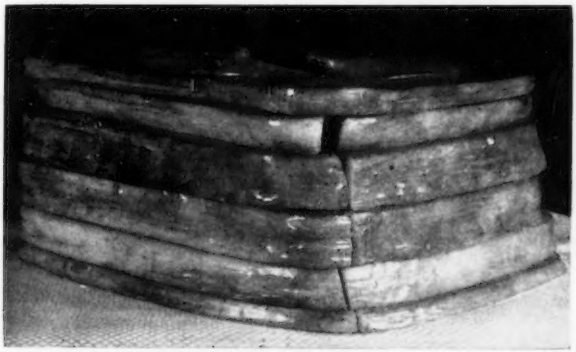

FIG. 3—View of wax reconstruction of the larynx from the front.

Also, let us see what lessons we can draw from this report that may aid in avoiding such surgical disasters. It has always appeared to me that the usual examination of larynges removed by laryngectomy was unsatisfactory. For the most part it has consisted of cutting slices through the center of the growth and at each end, extending them its full depth and well above and below. Sections from these slices can give assurance that one has gone beyond the growth in making these resections. One can, however, get no idea from these slides of the point of origin of the cancer, its pathways of extension, its shape and size, and its relation to the other parts of the larynx. In other words, one does not get, through the microscope, a good picture of the cancer as a whole.

Even the examination of a number of slides chosen from the whole series of sections does not give a clear picture of the appearance of the cancer itself, any more than serial sections of a cat would give an idea of the true appearance of a cat. On this account, I urge that each specimen be examined by serial sections. I am quite aware that this has been done by a number of authors, so I make no claim to priority.

Therefore, this larynx was, after being embedded in celloidin, sectioned serially from the top down. One of the sections was chosen from the center of the mass for especially careful histologic examination. It showed a tumor extending into the subephithelial tissues of the vocal cord, apparently not arising from the surface epithelium although the surface epithelium was thickened. The tumor was considered to be a fairly well differentiated squamous cell epithelioma. It extended deeply to the region of the mucous glands but did not invade the underlying cartilage. From this examination (states the pathologist) we cannot be sure of the adequacy of the resection, although grossly the excision appeared to be well wide of the tumor.

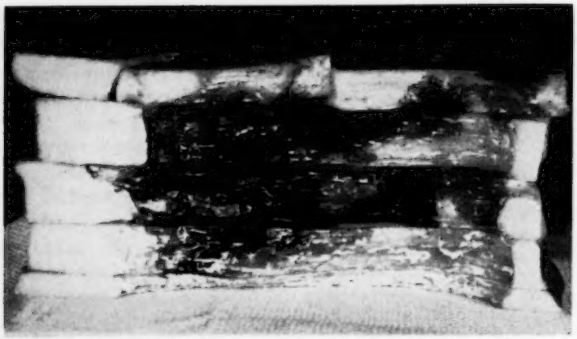

FIG. 4—View of the diseased side of the larynx. The left side has been cut away for exposure.

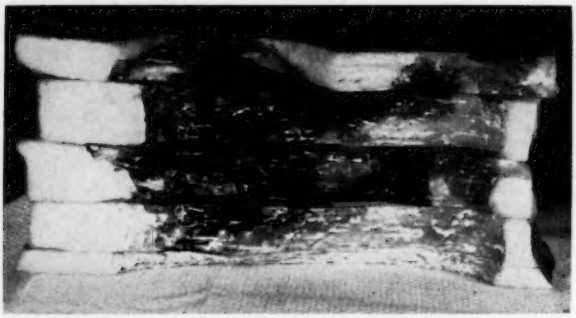

FIG. 5—View of the diseased side of the larynx with inner wall of ventricle removed. The disease extends from the uppermost part of the ventricle above to the subglottic region below, from the anterior commissure to the arytenoid region.

From the rest of the sections, a wax model at a magnification of ten was made of the tumor by the Borns wax plate method. This consisted of cutting, from sheets of various colored wax, outlines of the whole larynx, of the cartilages, and of the tumor itself. These wax sections were then piled one on another in their regular order and fused together, the whole forming a larynx magnified ten times and containing the magnified cancer.

The accompanying illustrations of this model as a whole and various cross sections of it will demonstrate the relation of the tumor to the whole larynx. The model demonstrates that the tumor was far larger than was thought probable from the data secured by the ordinary examinations made by a laryngologist. Figure 3 shows the whole model. Figure 4 is taken with the left side of the larynx removed so that we are looking directly at the diseased right side. This shows that the whole length of the cord is involved and suggests that there is an extension into the ventricle. When the inner wall of the ventricle is removed (fig. 5), it is seen that we have to do with a very extensive growth. It extends from the tip of the ventricle above to the subglottic region below and from the anterior commissure to the arytenoid region. This gives an idea of

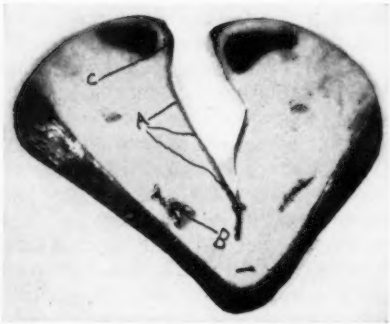

FIG. 6—View of model from above. This is about what would be seen in the larynx with a mirror. (A) Diseased vocal cord. (B) Extreme upward extension of disease in ventricle. (C) Hypertrophied mucous membrane.

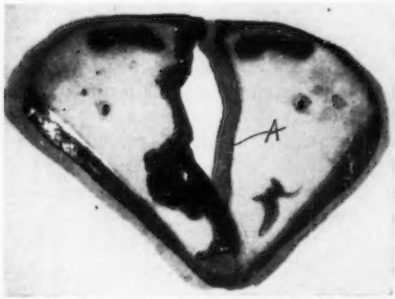

FIG. 9—View from above at level of left vocal cord. The posterior extension is receding. (A) Edge of left vocal cord with thick mucous membrane.

FIG. 7—View of larynx from above. Further exposure of mass in right ventricle. Most of cord concealed by ventricular bands.

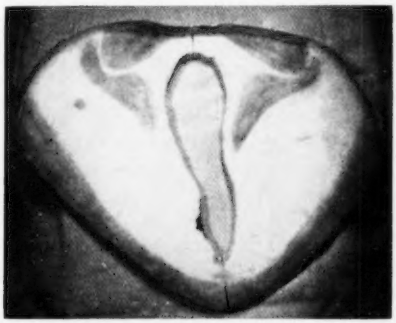

FIG. 10—Extreme extension of tumor in subglottic region. Cricoarytenoid joint clearly shown.

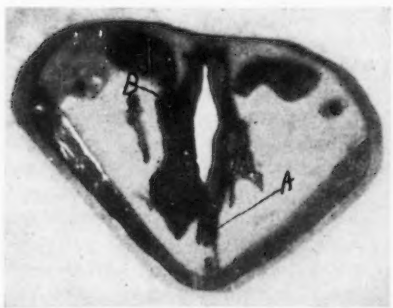

FIG. 8—View from above with ventricular band removed. (A) Anterior extension across midline. (B) Nearest approach to arytenoid.

the surface extension, but the cross sections give the true picture. Figure 6 shows that the growth extended to the very upper tip of the ventricle. As we examine successive sections downward, it is seen that there is a gradually enlarging mass in the outer wall of the ventricle which finally breaks into the interior of the larynx as it reaches the vocal cord. At this level it crosses the midline anteriorly and almost touches the arytenoid cartilage posteriorly. It extends below the cord, and in this section we see its lower termination (figs. 7, 8, 9 and 10).

You will remember that the pathologist reported that the growth did not involve the surface of the cord. We may conclude, then, that this cancer originated deep in the ventricle and slowly grew toward the cord so that by the time it reached the edge where it could be seen with a mirror, it was already a very advanced growth.

Now let us resume our study of this particular case in an endeavor to discover the origin of our failure. In the first place, you must note that attention was given to the patient's larynx only after eighteen months of intermittent hoarseness. Laryngeal cancer was not seriously considered until the hoarseness was persistent. This, of course, was when the edge of the vocal cord was affected. This is the old story of "too late" so often heard. It cannot be too much emphasized that when a patient of middle age is hoarse, even though he at times recovers his voice, cancer should be suspected. We are all too liable to call the trouble laryngitis; when the laryngeal examination is made only with a mirror, the real trouble may be missed. The reason for this is that most of us have been taught that the great majority of intrinsic cancers are cordal. With that in mind we expect hoarseness caused by laryngeal cancer to be early and continuous. If such is not the case, if nothing shows on the cord, the idea of a cancer is dismissed.

It appears to me that the serial sections and the reconstruction based on them explain very well the course of this man's disease. Remember that when first seen, seemingly only the anterior part of his cord was involved. Yet we know that at that time he had advanced disease. A tumor deep in the ventricle in that position may very well cause occasional attacks of hoarseness with aphonia. Only when the edge of the cord was involved did the hoarseness become continuous. The explanation of the late appearance of the three classic symptoms of intrinsic laryngeal cancer is thus easily arrived at in this case. The cancer did not begin on the edge of the cord, the hoarseness was not continuous, no tumor could be seen, there was no limitation of motion since the arytenoid joint was not involved. There being no invasion of the lumen of the larynx, the man had no dyspnea. There were no palpable glands. For these reasons his was considered a fairly early case. Nevertheless, following a laryngectomy he had a prompt recurrence and died.

It certainly was a misfortune that the mirror examination was trusted in estimating the extent of the growth. As can be seen from the model, the protrusion of the ventricular band largely hides the cord. Much more frequent use of direct examination should be made. If a laryngeal speculum had been used here, the infiltration of the upper part of the larynx would have been better appreciated. It might be said here that not so much attention should be paid to what is on the edge of the cord. More thought should be given to what may possibly be occurring deep in the tissue, as well as to the extent of the cordal involvement and, what is more important still, the subcordal involvement. The first sign of recurrence in our case was the coughing up of bloody crusts. These undoubtedly came from the mucous membrane of the tracheal stoma, although no ulcerations were seen when a tracheoscopy was done. The first sign of neck involvement was a tender mass just above the clavicle close to the stoma. The glands first to be infected are usually those high in the neck. In this man the high glands were the last to be involved. Moreover, a thing that is very unusual, this man developed cancerous axillary nodes not often seen in cancer of the larynx. Probably this infection of the axillary nodes did not extend direct-

ly from the laryngeal cancer but arose from the skin about the stoma. I have seen this happen only once before, also in a case of cancer whose reoccurrence was about the stoma. The reason why high cervical glands were not involved is shown by the sections. There is no evidence of cancerous extension through the lymphatics, which originate in the aryepiglottic folds. My suggestion, then, is early, careful direct examination of the larynx, which should include the ventricles and the subglottic space. The first tissue for biopsy taken from this man was obtained by the indirect method. I think this procedure in connection with carcinoma of the larynx is always a mistake. For a truly trustworthy biopsy a direct laryngoscopy should always be done. In difficult cases a general anesthetic should be used. It was not, however, as I have already said, from the ventricle that the disease spread to the neck but from the subglottic growth. Our resection appeared to go beyond the lower limits but evidently did not.

At the time I had this larynx cut in serial sections and reconstructed in wax, I thought I was a pioneer. When I began to look up the literature, I soon realized that I was not. A number of people had already done this sectioning. I am not aware that the reconstruction has been done before, although it may very well have been. As far as I know, the first to study serial section of laryngeal cancer was Robert-Leroux of Paris. He published the result of his investigation as a thesis in 1936. His study was so admirable that I am going to summarize it for you. His original paper would repay your reading as it is by far the most thorough work on this subject that I have encountered. He investigated each case from the point of view of history, laryngeal examinations, both mirror and direct, biopsy, and x-ray films by a technic which brings out the shadows of the soft tissues. He then described the operation finally decided upon, gave the reasons for the choice of this operation, and stated the final outcome of each case.

What particularly attracted my attention to this work was the fact that he completely exploded the idea that practically all intrinsic cancers of the larynx originate on the cord. He divided cases of intrinsic cancer into (1) vestibular, (2) ventricular, (3) cordal, and (4) subglottic. He demonstrated that each tumor originating in one of these areas has its own mode and direction of extension, both locally and through the lymphatics. Some produce symptoms early; some produce symptoms late. Moreover, the cancers of each point of origin have their own peculiar histologic formation which influences their course. He makes great use of roentgenograms in determining the site and location of the disease. He makes the point that films taken by the technics which he describes will reveal site and direction of extension of each tumor and do it fairly early. His article is very beautifully illustrated. He gives the mirror appearance of each growth, the appearance through the direct tube, the appearance of the removed specimen and histologic slides. Since reading his article, I have had a number of larynges cut in serial sections in an endeavor to see to what extent I could confirm his results. It is a very difficult task to carry out since it involves the very close cooperation of the radiologist, pathologist, and clinician. I have included brief reports of a number of these cases. One of these was a laryngectomy; the other cords were removed through the laryngeal fissure route.

CASE HISTORIES

Case 1. A man, 67 years old, on direct examination appeared to have a subglottic tumor far forward on the right side. The biopsy showed it to be a squamous cell epithelioma.

Since I have had a number of bad results when I removed subglottic tumors by laryngeal fissure, I decided on a laryngectomy for this man. In the gross specimen of the larynx the disease appeared to be very limited and I was inclined to have misgivings as to the necessity of such an extensive operation.

This man had a very slow convalescence since a bronchiectasis from which he had suffered off and on for many years was reactivated by the operation. The local result was excellent. The justification of the laryngectomy came two months later when a small mass developed in the glands beneath the sternomastoid in the upper part of the neck. A dissection of the neck was then done and the lymphatic chain removed. He has been well since that time, two and one-half years. This case gives a good idea of how dangerous subglottic carcinomas are. They are liable to invade the lymphatics early and to recur locally in the stub of the trachea. Even the radiotherapists shy away from them. The serial sections showed not only a subglottic growth but also one that was bilateral (fig. 11).

FIG. 11—Case 1. Section showing bilateral growth and that in anterior commissure.

Case 2. I have had a number of instances of subglottic growths, all of which have been difficult. About a year ago I saw a young man, about 35 years of age. He was complaining of hoarseness of several months duration. Examination with the mirror showed edematous cords, such a condition as is often seen in people who use their voices a great deal. It is usually treated conservatively or, if necessary, by stripping of the cords, which brings about a good result. A biopsy, which was negative, had already been taken in this case. (I want to say a word here parenthetically about the negative biopsy. When there is good reason to suspect the presence of carcinoma one should never be content with a negative biopsy. I have known only the third biopsy to reveal evidence of cancer. Biopsies should always be repeated.) To continue with our case, the patient was examined again with the direct laryngoscope, and a suspicious area was seen beneath the left vocal cord far back near the tip of the arytenoid (fig. 12). A biopsy of this was positive. Through a laryngeal fissure, the whole cord was removed including the arytenoid cartilage. The other cord was stripped and a frozen section showed only chronic inflammation. This man has been well for about a year.

Case 3. A man, 55 years old, was referred to me about two years ago on account of hoarseness. I made a mirror examination and could see only a slightly red vocal cord. The suspicious thing was that only one side appeared to be affected. I dismissed him with the warning that he should come again in a month. He did not come for six months, and then quite a large tumor was to be seen beneath the left vocal cord. This cord was removed through a laryngeal fissure and he has remained well since. The biopsy showed different grades of carcinoma in the same specimen (fig. 13).

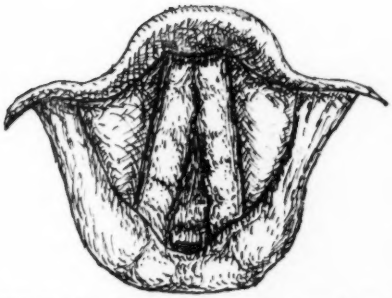

FIG. 12—Case 2. Examination of the larynx showed equal edema of both cords. On direct examination a subglottic carcinoma was found on the left side.

Case 4. As I have said, I always have a great many misgivings in connection with subcordal tumors even when they are small. The appearances even on direct examination are at times very deceitful. A man of 76 who was slightly hoarse showed on direct examination a very small tumor on the edge of the right vocal cord. The cord was perfectly mobile and the tumor was very small. It looked exactly like a benign polyp. I even went so far as to reassure him and his wife that he did not have a cancer, yet the tissue was positive. I have found that small tumors on the edge of the vocal cord are favorable to radiotherapy. Since this man was 76 years old and was very anxious to avoid an operation and preserve his voice, he was referred to a radiotherapist. The visible tumor promptly disappeared, yet he was back again in six months with pain and hoarseness. This time direct examination showed a subglottic tumor. My conclusion was that this tumor had grown upward from below and reached the edge of the vocal cord. This extension was the small tumor removed at the first biopsy. The radiotherapy had reduced the small extension but had not cured the subglottic growth. As I have said, these subglottic tumors appear to be unfavorable to radiotherapy. In any event, since he had had a large dose of x-ray already, some surgical procedure appeared to be necessary. Since he refused absolutely to have a laryngectomy and said he would kill himself if we did it, the larynx was opened by laryngeal fissure incision and the tumor dissected out. The operation was a failure and he eventually died of extension down the trachea. All these infiltrating growths are dangerous and difficult to remove. It appears to me that they all call for wide excision. Certainly partial excision through a laryngeal fissure is inadequate. One wonders if more use could not be made of the hemilaryngectomy operation. It sometimes strikes one as unnecessary to remove a whole larynx when three-fourths of it appear to be healthy. This operation is done frequently in Europe, and several American surgeons have reported good results.

Case 5. As a contrast to the infiltrating growth, I wish to report one case of a superficial growth. This man, age 60, had as his earliest symptom hoarseness. He had a very prominent papillary growth at the anterior third of the left vocal cord. This was excised through laryngeal fissure and serial sections made of the cord (fig. 14). You will see that the growth is very superficial, appears to be sharply limited before and behind, and does not invade at all. The removal is obviously adequate. Probably it is such cases as this which can be safely removed by intralaryngeal excision under suspension laryngoscopy.

SUMMARY

The few cases cited and the sections shown appear to demonstrate the importance of realizing the nature of the particular tumor which is being dealt with. Is it superficial or infiltrating? Is it actively growing or slow growing? Does it have a point of origin which gives it early access to the lymphatics or not? Are the cartilages already involved? the tissues external to the larynx? the lymphatic glands? You will see that in every case every means of diagnosis should be used, not only mirror examination but also careful direct examination, tomograph, films by the Robert-Leroux technic, and, finally, the histologic picture. Only in this way may proper treatment be decided upon. There is no doubt that the results of roentgen therapy are still improving, and this method of treatment may eventually be the method of choice in the majority of cases. However, it must be remembered that the x-ray is really a means of excision by burning. Once a case has received a full dose of x-ray by radium, it cannot be safely repeated. X-ray, moreover, sometimes seems to result in stimulation of the growth, and

FIG. 13—Case 3. (A) Section showing epithelial growth at upper edge of tumor. (B) Well developed cancer in central part of tumor. (C) Intraepithelial growth, again in lower part of tumor.

FIG. 14—Case 5. Section of fungating growth involving left vocal cord crossing the midline.

the patient is more miserable than if he had received no treatment. On the other hand, surgical treatment can by no means bring about a true cure. Even a cordectomy results in a rather poor voice. A laryngectomy, of course, is merely removal of the diseased organ and not a cure at all.

Perhaps the investigation best pursued will turn out to be the biochemical. It may very well be that when the nature and biochemistry of cancer cells is thoroughly understood, the cancer problem will be solved.

Wherry Memorial Lecture

THE MANAGEMENT OF DEAFNESS

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PITTSBURGH, PA.

DEAFNESS, in greater or lesser degree, is one of the most common afflictions of the human body at some time during life. Until the past generation it was one of the most neglected of human ailments. We can be justly proud of the progress made in this field of medicine in recent years, though there is still a long way to go.

Congenital hearing defects should occur more rarely with correction of Rh incompatibility and with better control and prevention of such diseases as syphilis and German measles in pregnant women.

Toxic damage of the cochlea or acoustic nerve as a sequela of the acute exanthemas is also on the decrease due to effective prevention and efficient management of the primary disease. We no longer see the ravaging effects of diphtheria and typhoid fever because the primary diseases have been nearly eradicated. Toxic nerve deafness still occurs in some cases following severe attacks of measles, scarlet fever, mumps and whooping cough, though these also are on the decline. The acoustic nerve is sensitive to certain drugs such as quinine, streptomycin and, occasionally, the salicylates. With more careful and judicious usage of these drugs, toxic nerve damage has been greatly reduced.

Deafness due to destructive local lesions from middle ear and mastoid infections has decreased tremendously in the past decade with the advent of biochemicals. In fact, acute mastoid infections now have become almost a rarity.

The prevalence of chronic suppurative otitis media with cholesteatoma has not been noticeably affected by use of the biochemicals, which have little or no effect on this condition. Resort to radical surgery is needed just about as frequently now as it was a generation ago. However, there has been a definite improvement in surgical judgment and technic. Whereas, formerly, the classic radical mastoidectomy usually was performed for this condition, most otologists now modify the operation to suit the individual case rather than make the case fit the operation. They now preserve the ear drum and ossicles whenever feasible, thus preserving the hearing at a higher postoperative level. The basic cause of attic perforations with subsequent suppuration and the development of cholesteatoma as yet has not been satisfactorily explained and continued study of this condition is needed. It is my opinion that perforations of Shrapnell's membrane occur most frequently as a complication or sequela of chronic secretory otitis media. During the past five years I have observed attic perforations occur in 4 cases of recurrent secretory otitis in which the ear drums previously had been intact. These 4 cases developed secondary cholesteatomas and 2 of them required surgical intervention. I have also seen perfora-

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tions of Shrapnell's membrane occur and later close spontaneously if secondary infection did not occur. Open, dry perforations of Shrapnell's membrane with no history or evidence of infection are not rare and some of these cases subsequently develop otitic infections and cholesteatomas, the most common cause being the introduction of water into the meatus from swimming or syringing the ear.

Secretory otitis media or otitis media with effusion is a condition far more prevalent than is generally realized, being especially common in children. I do not agree with some of my confreres that these so-called fluid ears are occurring more frequently in the past few years than formerly. I maintain that they have been present continuously and were not recognized by many otologists. This condition was considered of sufficient importance nearly a century ago to merit some thirty pages in Politzer's classic textbook. The paucity and mildness of the symptoms, the fact that the great majority of these patients are young children and the lack of careful examination and keen observation on the part of the otologist account for the failure to diagnose this condition more frequently. We now know that the great majority of these cases have an allergic basis and that treatment of the accompanying nasal allergy is often necessary in order to control this condition and to prevent recurrences. The failure to recognize and control secretory otitis media in children is responsible for many of the hearing defects discovered later in life. I believe many of these cases of allergic rhinitis and secretory otitis media would be prevented by proper feeding of young infants. The infant's head should be kept elevated at least 30 degrees from the horizontal when it is fed from a bottle; otherwise, it cannot swallow without forcing fluids into the nasopharynx. The frequency of childhood allergies to milk and orange juice may well be due to this insult to the tissues of the nasopharynx.

One of the greatest otologic achievements of the present century has been the development and perfection of the fenestration operation for clinical otosclerosis. This operation already has restored practical hearing for speech to thousands of individuals who otherwise would have gone through life hopelessly hard of hearing. It should be remembered, however, that this operation is purely a mechanical procedure to bypass the oval window, which has become obstructed because of the fixation of the stapes by an overgrowth of bone. The operation will not restore any hearing loss due to nerve degeneration. The operation is definitely an elective procedure, since an individual who will hear well following the operation will also hear well with a hearing aid. Time alone will tell how permanent is the hearing improvement obtained by this operation and whether or not secondary nerve degeneration continues at the same pace as in the unoperated ear. Reports of ten- and twenty-year results will be most interesting. Conservative medical treatment of clinical otosclerosis has failed to prove of any value whatsoever up to the present time.

Deafness due to fluid changes and distention of the endolymphatic system occurs in Ménière's disease. Although the deafness simulates a true nerve deafness with poor bone conduction and uniform hearing loss throughout the scale, actual damage and degeneration of the nerve cells may not occur for years. There is increasing evidence that this is primarily a cochlear disturbance and that vestibular involvement and attacks of vertigo may be prevented by prompt and early treatment. The fluctuating degree of deafness with roaring tinnitus, distortion of sounds and hy-

persensitivity to loud noise makes the diagnosis relatively easy. The hearing loss is reversible in some cases if treated early with peripheral vasodilators or histamine hypodesensitization, although no specific treatment has yet been found to yield uniformly good results. The basic cause of this condition is probably an intrinsic allergy affecting the internal auditory artery and its branches.

Perceptive or nerve deafness due to vascular disorders is definitely on the increase. As the average span of life continues to lengthen, we will see more and more cases of high-tone nerve deafness due to gradual vascular degeneration and an inadequate blood supply to the cochlea. This deafness is irreversible and progressive, and local therapy is of no value. Cardiovascular regulation may retard the progress of the hearing loss.

Cases of traumatic nerve deafness due to explosives or to continuous or repeated exposure to excessive noise have increased tremendously in the past decade largely because of the recent world war. In our modern machine age, there are many occupations in which the worker must labor in an environment of noise at a dangerously high level. There is a wide variation in individual tolerance to excessive noise. It has been my observation that the hearing of an ear with a large and straight external auditory meatus seems much more susceptible to damage than one with a small, curved meatus. Industrial organizations are becoming more interested in this problem because of their possible liability to pay disability compensation for deafness. Some are now requiring audiograms of new employees so as to eliminate liability for deafness acquired prior to employment. Sound treatment of buildings and insulation of machinery help to lower the noise level. Ear defenders should be provided when a dangerous noise level is unavoidable. The general public is becoming more noise conscious and many complaints are being registered about unnecessary and excessive city noises. Unless some measures are taken to reduce the general noise level of our cities and towns, I predict that the acuity of hearing of the general public will gradually be lowered before many generations have passed.

One other type of deafness which is rarely recognized is functional or psychogenic deafness. Studies at the army rehabilitation centers during the past war revealed a surprising incidence of nearly 20 per cent of cases of functional deafness among the total cases of hearing disorders which they surveyed. Audiology clinics are now picking up from 4 to 5 per cent of the cases referred to them. An important finding is the fact that the majority of the cases of functional deafness have an underlying organic deafness of greater or lesser degree. The management of these cases is very unsatisfactory at present. They need psychiatric aid, but there are too few psychiatrists and many of them are indifferent or uninterested in this type of case. There seems to be little doubt but that many of the so-called miracle cures of deafness following the use of some pet remedy have really been the result of a functional alteration in these psychosomatic cases.

Only the very few of us who have had the experience of wearing carbon types of hearing aids with distorted amplification, loud friction noises and large cumbersome batteries can fully appreciate the improvements which have been made in the development and perfection of modern hearing aids. These are proving a great boon to nearly a million people who have defective hearing which has not been improved by medical or surgical therapy. I, personally, can hear better and understand more with my present hearing aid than

I could fifteen years ago, even though my hearing loss for speech has increased from a 50 decibel average to an 85 decibel average during the intervening years. Otologists should have a working knowledge of the characteristics of hearing aid amplification and should have an understanding of what hearing aids can and cannot accomplish. For people with a conductive or mixed form of deafness, the present hearing aids perform very satisfactorily with uniform amplification throughout the scale. It is much more difficult, however, to provide a satisfactory hearing aid for cases of perceptive or nerve deafness, especially if there be a disproportionate loss of hearing for different parts of the scale. Hearing aids are unsatisfactory and, in some instances, of no value for cases with good hearing for the lower scale but an abrupt, severe loss of hearing for tones above 1000 cycles. This is the type of hearing loss so commonly found in cases of traumatic deafness and in presbycusis. Fortunately, these people can converse readily with one or two persons in quiet surroundings. The louder the background noise the more difficult does it become to interpret individual voices. Amplification of sounds, including the background noise, does not help the power of interpretation. A small ear trumpet is often more helpful for this group of cases than an electric aid.

For the severely deafened, and especially for young children with defective hearing, much more help is needed than can be obtained from a hearing aid alone. This is where an audiology department or aural rehabilitation clinic renders valuable service. Speech reading and auditory training are of great help to the severely deafened for whom a hearing aid alone is insufficient to provide the ability to understand readily normal conversational speech. Another valuable service is the preschool training of young children and their parents. Formerly, the deafened or defective child frequently was neglected until it reached the public school age and valuable years of training were lost. These clinics are of great help in analyzing hearing defects and in solving diagnostic problems such as the detection of functional or psychogenic deafness. Their busiest service is hearing aid evaluation and educational training in the proper usage of hearing aids. A well equipped audiology department is expensive and will not be self-supporting, but it provides a most important public service and merits serious consideration in the allotment of public funds and subsidies by foundations and universities.

What is the present situation regarding the clinical management of deafness? It is quite good insofar as reversible forms of deafness are concerned. However, the majority of hard of hearing patients who consult us have irreversible forms of deafness which are not amenable to treatment. We fail badly in our management of this large group. For some strange reason many doctors refuse to admit that they cannot improve the hearing of these patients by means of local treatments. Also, many false diagnoses are made because of cursory examinations and insufficient study.

Cases of conductive deafness without suppuration or obvious damage of the conductive apparatus too frequently are classified as having "chronic, catarrhal otitis media" and are treated with repeated inflations, regardless of whether or not the hearing may improve. The term "chronic, catarrhal otitis media" is a trash-pile diagnosis and should be eliminated from our medical terminology. Unless prompt improvement of hearing occurs following two or three inflations, this type of treatment is usually contraindicated.

Reports of thickened, retracted and distorted ear drums are often erroneous and the ear drums merely show variations of the normal. Too many cases of otosclerosis are treated year after year with inflations and massage. A pneumatic ear speculum is rarely employed to determine whether or not the ear drums are mobile and the middle ears ventilated. If the patient complains of a lack of hearing improvement, the inflations may be continued anyway to prevent the hearing from getting worse, though irradiation and operative procedures may also be tried. Many tonsils, teeth and nasal septa are sacrificed on general principles to keep the patient satisfied and hopeful of improved hearing.

Cases of mixed deafness and of perceptive or nerve deafness are subjected to a whole gamut of treatments depending on the imagination and ingenuity of the therapist. Irradiations, vitamins and shots in the arm are added to the basic office treatments of nasal sprays and inflations. In the past thirty years the following types of therapy have enjoyed varying degrees of popularity: subaudible vibratory machines to stimulate the organ of hearing; massage and titilation of the eustachian tube orifices; irradiation; thyroxine; prostigmine; Jacobsen's solution; and various vitamin combinations, most recently large doses of vitamin A. Another recent form of therapy is based on the finding of hypercholesterolemia and hyperpyruvemia. Some of these forms of treatment were based on apparently sound, scientific reasoning and were tried out by many of us before it became apparent that they were of little or no value. If vitamin deficiencies were so important in causing nerve types of deafness, it seems very strange that surveys of large groups of evacuees from Japanese concentration camps in the past war failed to show any greater incidence of auditory nerve defects than similar groups of healthy troops, even though the evacuees suffered from extreme malnutrition and avitaminosis. Is it a mere coincidence that new remedies for deafness so frequently reach the headlines of the public press? It should be noted that many specific remedies have been advocated for deafness in general without consideration of the actual type of deafness or its cause. People with irreversible hearing defects can be counted by the million, most of them unwilling to accept the fact that their deafness cannot be cured and eager to try any new form of therapy purported to improve their hearing. They afford a lucrative source of income to unscrupulous therapists.

Why do these various types of treatment attain such popularity and why do we read so many reports of improved hearing following these treatments? The answer lies in the curious psychology of the hard of hearing.

It is a natural reaction for a hard of hearing person to have a sense of inadequacy and abnormality and to develop a severe inferiority complex when he has difficulty in conversing with his normal fellow men. In the race for survival of the fittest and in the competition to earn a livelihood, he feels definitely handicapped. The so-called selfishness of the deaf is the result of his failure to make an effort to overcome this handicap. Since he cannot hear well or readily understand what is said to him, he stops listening. Lack of attention and failure to listen make him seem much deafer than he really is. Hearing tests and audiograms are inaccurate since they are subjective tests. If he does not listen attentively, he will naturally make a poor score. A hearing aid is repugnant to him as it advertises his infirmity. He wants a miracle, not crutches. If he consults an otologist and is told that his hearing cannot be improved and that he should

try a hearing aid, he becomes resentful and indignant. He is now ripe for plucking by any therapist who will tell him that his deafness can be cured or helped by treatments. The initial effect of these treatments is often an apparently marked improvement of hearing noticeable not only to the individual but also to his friends and associates. Audiograms also will show improved scores. This improvement, however, may be purely illusionary. With the hope and expectation of recovering his hearing he becomes alert and attentive. He starts to listen again, which accounts for the apparently improved hearing. When, however, further improvement fails to occur, he soon becomes despondent and ceases to listen, whereupon the initial improvement is lost. The fear of further hearing loss, and especially of total deafness, may influence him to continue treatments even though he may subconsciously know that he is not being helped by them.

I occupy an almost unique position, since I am a severely deafened otologist. I wasted from five to ten of what should have been the best years of my life as a selfish, depressed and self-pitying young man. I experienced the wild hopes and bitter disillusionments of futile treatments for my deafness. I not only was harming myself but I became a burden to my family and a nuisance to my friends. I was like an ostrich with my head in the sand trying to conceal something which everyone already knew. It was not until I finally accepted my deafness as an unalterable fact and acquired the determination to overcome my handicap that I really began to enjoy life again. I learned to listen not only with my ears but also with my eyes and my brain. Today this is called speech reading and auditory training. I learned to use a hearing aid effectively, though I admit that the early models were very unpleasant with their distorted amplification. One of my most difficult tasks was the re-education of my own speech. With both ears plugged by ear receivers, I found it very difficult to modulate my own voice. Even at present I am liable to shout when excited or mumble inaudibly when embarrassed. From my own experience I have learned that the handicap of deafness is about 90 per cent imaginary. When we cease waiting for miracles and are willing to accept crutches, we soon discover that the crutches need not be at all burdensome.

It has been only during the past ten years that I have fully appreciated what a tremendous asset my deafness has been to me in the practice of otology. There is a feeling of comradeship and understanding between a hard of hearing patient and his hard of hearing physician which could not occur if the physician's hearing were normal. Patients will accept advice and opinions from me which I know they would not accept from a physician with normal hearing.

The otologist has a definite obligation to his hard of hearing patients. If medical and surgical therapy are ineffective in improving the hearing, psychologic therapy is still available and badly needed. Fifteen to thirty minutes spent in a frank discussion of his problems will often give the patient greater help than months or years of futile treatments.

In closing I offer a few final words of advice on the management of patients with irreversible hearing loss.

Discuss their problems with them frankly.

Tell them the nature of their deafness and why they cannot be helped by medical or surgical treatment.

Gain their confidence by telling them the score and what they can do to balance the score.

Be positive and firm with your advice but give them encouragement.

Do not give them sympathy. They crave sympathy but already pity themselves too much.

Do not tell a patient his hearing will get worse. Hedge, if you must, by saying that adjustments, training and hearing aids will more than counterbalance any further hearing loss.

Never tell a patient that he will become totally deaf. The greatest phobia the hard of hearing experience is the fear of total deafness. Reassurance on this point alone frequently will be of more benefit to the patient than all the medical and surgical therapy we can offer.

It takes time and effort to convince hard of hearing people that they must accept their handicap as an actuality before they can be guided onto the path leading to necessary readjustments and rehabilitation. If we consider ourselves to be real otologists we will gladly expend this time and effort in their behalf.

Jackson Memorial Lecture

OPTIC NERVE SHEATH HEMORRHAGE

FRANK B. WALSH, M.D.
and
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BY INVITATION
BALTIMORE, MD.

I AM grateful for the high honor accorded me in the privilege of delivering the Jackson Memorial Lecture. It is traditional that original work be presented as a tribute to the memory of Dr. Jackson. With this in mind I decided to investigate optic nerve sheath hemorrhages, particularly from the standpoint of their relation to intracranial hemorrhages. In the studies which are described in this communication, the assistance of Dr. Thomas R. Hedges, Jr., has been invaluable and I am happy to include him as co-author.

Mention of our studies in the order of their occurrence may hold interest since the arrangement of material in the body of the paper does not reflect the chronology of our efforts. An incomplete survey of the literature revealed a paucity of detailed information regarding optic nerve sheath hemorrhages. Mention is made of them in many papers but other problems, usually papilledema, receive principal attention. Three authoritative papers were exceptions to this generalization; the earliest, that of Liebrecht (1906),[10] a paper by Behr (1935),[2] and Ballantyne's recent paper (1943).[1] There were available in the pathology department of the Wilmer Institute many specimens of hemorrhage in the optic nerve sheaths. This material was studied and in each case the histologic findings were correlated with the clinical history and other autopsy findings. In this readily available material, however, only the posterior half of each eye and a short segment of the optic nerve and its sheaths were included. It was obvious that examinations of the optic canals must be made if conclusions concerning the relationship between intracranial and optic nerve sheath hemorrhage were to have any real value. The necessary specimens containing the optic canal were obtained from normals and from cases in which intracranial or optic nerve sheath hemorrhages were present. Decalcification was a part of the preparation of all but two of our eight canal specimens. Injection experiments were performed on cadavers, essentially in the manner recently described by Field and Brierly[8] on living animals, with results similar to those they described regarding the passage of India ink into the spaces about the optic nerve. Animal experimentation was not a part of the study.

The paper is divided into two parts. Part I concerns anatomy and pathologic studies of the optic canal in cases of intracranial hemorrhage. In this part of the paper, sections included the optic canal. Part II contains observations on a large series of cases in which hemor-

From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital.
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rhage was present in the optic nerve sheaths, but in which only the anterior segment of the optic nerve and posterior segment of the eyes were available for study.

PART I

ANATOMY

No effort is made here to supply detailed descriptions of the anatomy of the optic nerve sheaths and optic canal. The legends on figures 1 to 7 are self explanatory. Attention is drawn to facts which are fundamental to an understanding of optic nerve sheath hemorrhages and which are substantiated by the sections shown (figs. 1-7).

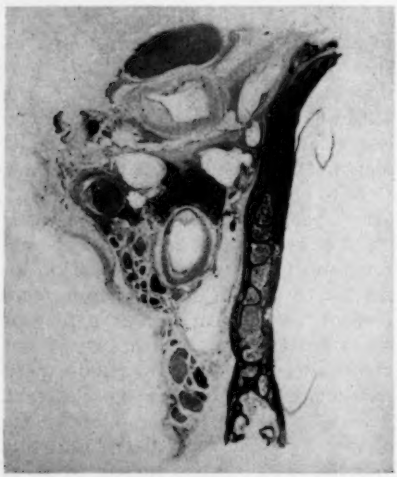

FIG. 1—Transverse section through the left cavernous sinus. The optic nerve is above, separated by dura from the carotid artery below. The third, fourth, fifth and sixth nerves lie in the lateral wall of the sinus. There is a layer of bone shown medially. Intraneural hemorrhage is seen in the third nerve. The ophthalmic artery is arising from the carotid artery.

Examination of the cross and longitudinal sections shown suggests that there is a considerable amount of free space between the optic nerve and the bone in the optic canal. In several longitudinal sections we did not see such a

FIG. 2—Transverse section at the cranial end of the left optic canal. The floor of the canal is complete. At the anterior portion of the cavernous sinus the carotid artery is sectioned through its walls as it makes its anterior bend. Beneath the carotid artery fat is present, which suggests that the superior orbital fissure is present inferiorly. Hemorrhage is seen about the third nerve, which lies lateral to the carotid artery. Also, there is hemorrhage in the meningeal spaces above the ophthalmic artery in the floor of the canal. The hemorrhage infiltrates the nerve septa.

space. It is, however, impossible to evaluate longitudinal sections in this regard because in them free space, if small, can be missed in sectioning. If the cross sections are carefully studied, it will be seen that there is retraction and distortion of tissues. If added to these changes there is the shrinkage which occurs in the soft tissues in fixation, it becomes obvious that any free space which exists in the optic canal must be very small indeed. Actually, the amount of space varies in different specimens, as we have observed. Consideration of measurements given by Wolff,[19] and also Whitnall,[18] makes it clear that 1 mm. is a liberal estimate of the free space about the optic nerve.

India ink in a gelatin solution finds its way into these spaces after it has been injected into the cranial subarachnoid space (figs. 8-11). It is noteworthy in

FIG. 3—Transverse section in the left optic canal. The roof of the canal is represented by a layer of dura (falciform fold). The meningeal spaces are well represented. Hemorrhage is seen in the subarachnoid space about the nerve. The ophthalmic artery lies below the nerve in the dura. Intradural hemorrhage arises in the superior lateral portion of the canal where vessels are present. The superior orbital fissure lies below the floor of the canal and contains nerves, vessels and orbital fat. Hemorrhage is present in the dura and in the perivascular spaces about the third nerve. The posterior aspect of an intraneural venous channel in the optic nerve is seen to empty into the subarachnoid space.

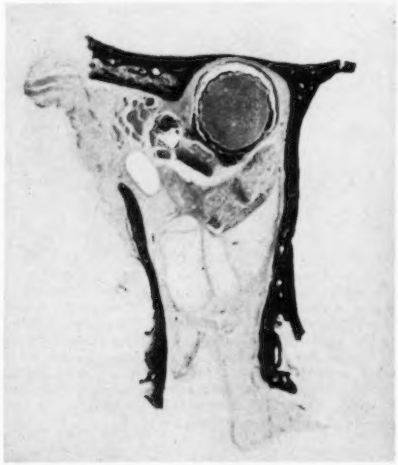

FIG. 4—Transverse section at the anterior end of the canal. The floor of the canal is absent and the muscle cone is forming inferiorly. The ophthalmic artery takes a more lateral position. Intradural hemorrhages are appearing on each side of the artery. The hemorrhages arise from venous channels which are seen in relation to the artery. Perineural hemorrhage persists about the third nerve lateral to the optic nerve.

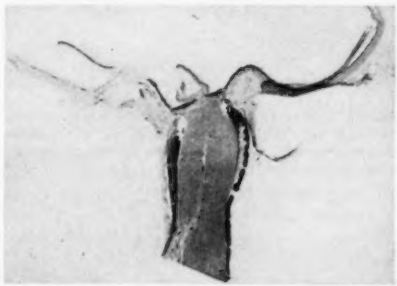

FIG. 5—Section of the posterior segment of the eye and anterior optic nerve. The central vessels are seen as they enter the nerve. They take an oblique course anteriorly. Massive subdural and subarachnoid hemorrhage is present in the optic nerve sheaths.

our specimens, and also in those of Field and Brierly,[8] that there is not a definite column of ink but rather an infiltration of particles which are fixed in the meninges, through the canal and in the orbit. Our studies have not concerned cerebrospinal fluid. From what has been stated and shown in the figures it is certain that blood flow through the canal from the cerebral to the orbital subarachnoid space is slight, if it occurs at all. Our studies on intracranial and nerve sheath hemorrhages, which are described subsequently, confirm and amplify this statement.

The vessels in the optic canal engaged our attention. It is apparent in many sections that in addition to the ophthalmic artery, there are veins or venous blood channels within the dura in the bony canal (figs. 12 and 13). These channels are continuous with the orbital veins anteriorly and empty into the cavernous sinus posteriorly. In several sections we observed venous channels emerging from the bone of the optic

FIG. 6—Longitudinal section through the center of the optic nerve of the right eye. The ophthalmic artery is seen entering the canal. The carotid artery lies below the nerve posteriorly. The anterior lobe of the pituitary is seen in the inferior posterior part of the section. Hemorrhage is present in the meninges anterior to the ophthalmic artery and can be traced forward in the subarachnoid space in the orbit. A large intradural hemorrhage is present at the apex of the orbit beneath the nerve.

FIG. 7—Longitudinal section through a more lateral portion of the canal. The ophthalmic artery is seen entering the orbit. Hemorrhage in the optic nerve sheaths persists, also the large intradural hemorrhage at the apex of the orbit.

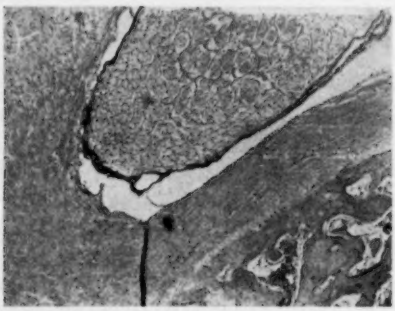

FIG. 8—Section through the intracranial portion of the optic nerve and canal. Dye is seen in the arachnoid tissues about the nerve as it enters the canal.

FIG. 9—Transverse section through the midcanal showing dye in the arachnoid tissues and inner layer of the dura along the inferior aspect of the nerve.

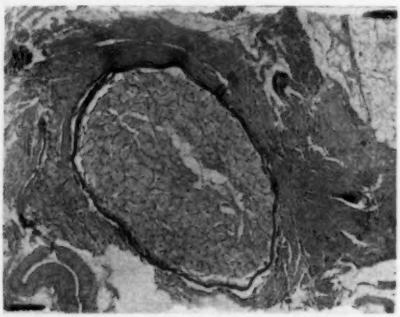

FIG. 10—Low power showing dye about optic nerve in the orbit.

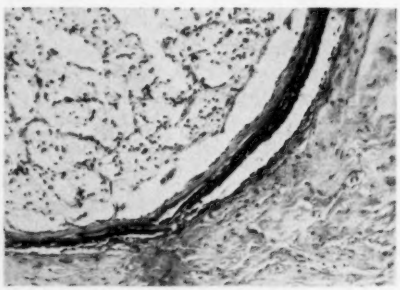

FIG. 11—High power of preceding section.

canal. These venous channels emptied into the dural veins within the canal. They are analogous to the diploic channels in the skull which empty into the cranial dural sinuses.

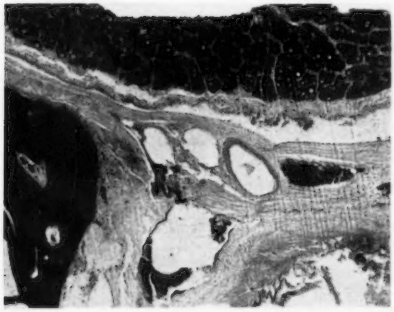

FIG. 12—Transverse section through the anterior end of the cavernous sinus showing the ophthalmic artery and optic nerve before their entrance into the canal. Venous channels are seen on each side of the ophthalmic artery. The venous channel on the left enters the cavernous sinus adjacent to the carotid artery.

FIG. 13—Transverse section through the cranial end of the optic canal slightly further forward than seen in figure 12. The ophthalmic artery and its accompanying venous channels lie in the dura beneath the optic nerve in a groove in the bone. The venous channel on the right communicates with an extension of the cavernous sinus through the floor of the canal.

We have not identified with certainty a continuous posterior, central vein within the optic nerve as described by Vossius and Kuhnt. We have, however, seen isolated venous channels within the optic nerve in the canal (see figure 20). It is noteworthy that such venous channels were seen leaving the optic nerve only in cases of massive cerebral subarachnoid hemorrhage.

HEMORRHAGES IN THE OPTIC NERVE SHEATHS

We secured autopsy material from 6 cases of spontaneous intracranial subarachnoid hemorrhage. The entire optic nerve and bony canal, as well as the posterior segment of the eye, were studied in serial sections in 4 cases. In 2 cases sections were taken from the canal and posterior orbital optic nerve. All of these cases are now described and several figures are shown.

Case 1. A case of spontaneous intracranial subarachnoid hemorrhage following lumbar puncture.

Autopsy revealed intracerebral hemorrhage and a small amount of subarachnoid bleeding. There was absence of cerebral edema. Serial sections through the optic canals and entire optic nerves did not reveal any hemorrhage within the optic nerve sheaths.

Case 2. Spontaneous intracranial hemorrhage of slow onset.

There was intracerebral hemorrhage with subarachnoid extension of moderate degree. Cerebral edema was present, but it was not pronounced. Longitudinal sections of the optic canals and optic nerves were made. There were small scattered hemorrhages in the sheath spaces. These hemorrhages first appeared near the posterior portion of the optic canal. Within the canal the sheath spaces were poorly defined and what little hemorrhage could be seen was unevenly distributed between the dura and the nerve (fig. 14). At the orbital end of the canal hemorrhage appeared in the dura (fig. 15). This hemorrhage increased in amount as the sections progressed anteriorly but disappeared within a few millimeters. Subdural and subarachnoid hemorrhage was present in the sheath spaces in the orbit in a patchy distribution. Hemorrhage was most pronounced in the subdural space anteriorly and beneath the point where intradural hemorrhage was seen. Only a small amount of subdural hemorrhage was present in the anterior segment of the nerve behind the globe.

Case 3. Spontaneous intracranial subarachnoid hemorrhage of rapid onset causing sudden exodus.

Massive intracerebral and subarachnoid hemorrhages were present on the left with extension of the hemorrhage over the entire right hemisphere in the subarachnoid space.

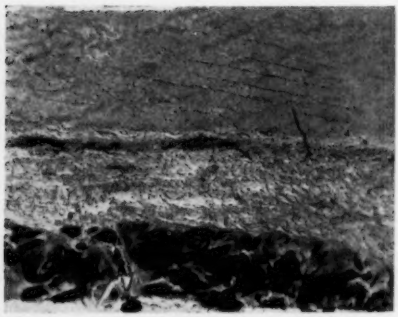

FIG. 14—Case 2. Longitudinal section showing scanty hemorrhage in the sheath spaces in midcanal. Venous channels in the dura next to the bone are seen to communicate with blood spaces in the bone.

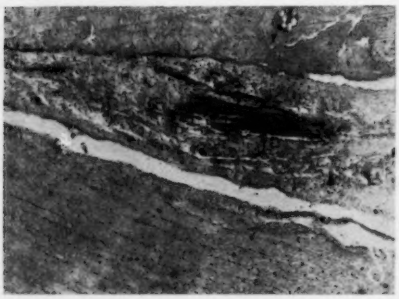

FIG. 15—Case 2. Low power view of intradural hemorrhage at the orbital opening of the canal.

There were many scattered hemorrhages of varying size throughout the orbit beneath Tenon's capsule. Serial sections were done, transversely on the left and longitudinally on the right, from the base of the brain through the cavernous sinus and optic nerve in its entirety, also the posterior segment of the eye. On both sides, intracanalicular hemorrhage did not appear until after the ophthalmic artery had entered the dura at the cranial end of the canal (fig. 16). (See also figures 6 and 7.) At this point, where accompanying veins were present in the normal specimen, hemorrhage began in the subarachnoid space and could be followed forward into the orbit. No hemorrhage was seen in the meningeal spaces posterior to the entrance of the ophthalmic vessels into the canal. In the cavernous sinus, hemorrhage infiltrated the substance of the third nerve (fig. 17). (See also figure 1.) As the nerve left the sinus and entered the superior orbital fissure, it was seen that hemorrhage remained about the nerve, infiltrating its dural coat. Such hemorrhage extended forward into the orbit for several millimeters (fig. 18). Within the canal, hemorrhage entered the meningeal spaces anterior to the point where the ophthalmic artery and its accompanying veins entered the canal. Hemorrhage was also present within the optic nerve in the midcanal. This hemorrhage communicated with the subarachnoid spaces. Between the nerve fiber bundles venous channels were seen at the middle portion of the canal in the area of the intraneural optic nerve hemorrhages. These channels could be traced to the periphery of the nerve, where they emptied into the subarachnoid space (fig. 19). A single, large venous trunk could be traced from this point forward for several millimeters in the center of the nerve (fig. 20). At several points in the canal fresh hemorrhage appeared in the dura about collections of vessels. These hemorrhages communicated with the subdural space. At the orbital open-

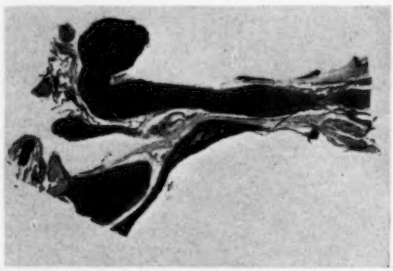

FIG. 16—Case 3. Longitudinal section through the medial portion of the optic canal. The optic nerve is seen extending from the chiasm forward through the canal. Hemorrhage makes its appearance within the optic nerve sheaths rather far forward in the canal.

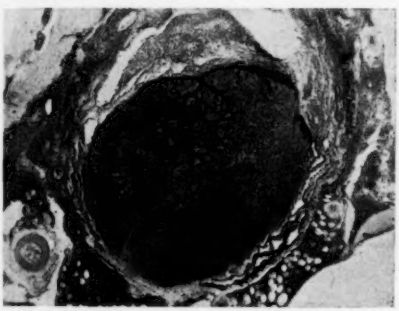

FIG. 17—Case 3. The third nerve within the cavernous sinus contains hemorrhage which extends into the nerve from the periphery between the nerve fiber bundles.

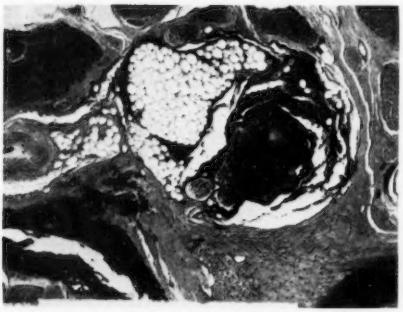

FIG. 18—Case 3. The third nerve in the orbit has hemorrhage about it.

FIG. 19—Case 3. Hemorrhage in the optic nerve, also intraneural venous channels.

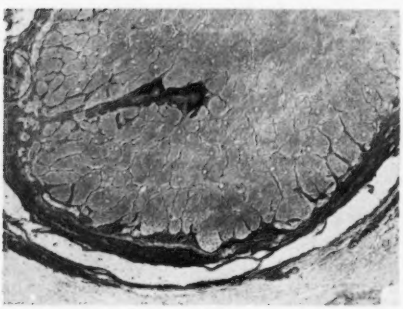

FIG. 20—Case 3. Intraneural venous channels persisting several millimeters forward from previous figure.

ing of the canal, large intradural hemorrhages arose from veins as they passed through the dura at this point. These hemorrhages communicated with both the subdural and epidural spaces (fig. 21). At the entrance of the central vessels into the dura more intradural hemorrhage was seen and communicated with the subdural space (fig. 22). From this point forward, both subdural and subarachnoid hemorrhages could be traced to the globe where they were massive in the ampulliform dilatation of the sheath spaces behind the sclera (fig. 5). At the apex of the orbit many scattered hemorrhages were seen in the orbital tissues, particularly about nerves and arteries and in the orbital fat (fig. 23).

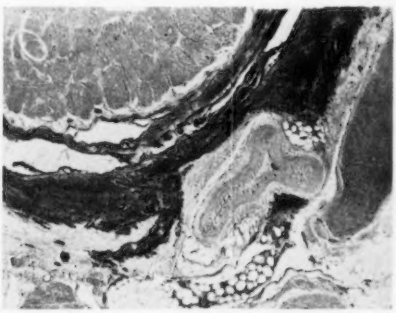

FIG. 21—Case 3. Low power view of intradural hemorrhage at the apex of the orbit on each side of the ophthalmic artery. The hemorrhage has originated through rupture of veins in the dura. Intradural hemorrhage communicates with the subdural and epidural spaces

Case 4. Spontaneous basilar subarachnoid hemorrhage of rapid onset causing sudden exodus.

There was a pontine hemorrhage, with massive subarachnoid hemorrhage limited to the posterior fossa. Serial sections were done through the cavernous sinus, optic canal and orbital optic nerve. No hemorrhage was seen at the cranial end of the optic nerve sheaths. There was a large hemorrhage in the substance of the third nerve (similar to that seen in case 3 [fig. 17]) within the cavernous sinus. The hemorrhage could be traced forward in the perineural spaces and dura to the superior orbital fissure. In the midcanal an intrafascicular optic nerve hemorrhage communicated with the subarachnoid space. There were several small intradural hemorrhages present in the canal and these communicated with the subdural space. At the orbital opening of the canal a large intradural hemorrhage

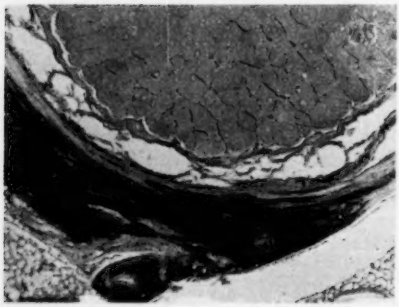

FIG. 22—Case 3. Intradural hemorrhage is seen at the orbital opening of the canal where vessels pass through the dura.

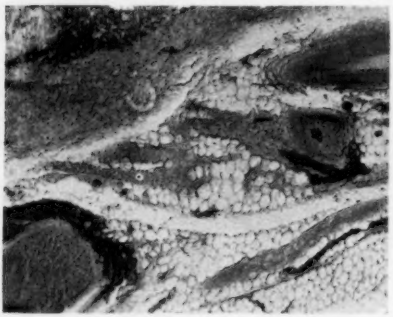

FIG. 23—Case 3. Low power view of hemorrhage about large nerves and vessels in the orbit.

FIG. 24—Case 4. Gross specimen of optic nerves with the canals intact. When sections were made, it was seen that scattered hemorrhages appeared in the dura at the orbital end of the optic canal. There was no hemorrhage within the canal in serial sections.

was seen, as in case 3. At the entrance of the central vessels in the orbital part of the nerve, a large intradural hemorrhage was seen. It extended into the subdural space from this point forward to the globe (fig. 24).

Cases 5 and 6. Cases of spontaneous intracranial subarachnoid hemorrhage.

In these cases serial sections were not made, but sections were taken from the optic canal, chiasm, and orbital optic nerve. The findings in these cases were identical. There was no hemorrhage in the sheaths within the canal. At the anterior opening of the canal the dura contained hemorrhage, which extended forward for several millimeters. In one case, intradural hemorrhage was massive at the apex of the orbit (figs. 25 and 26). More anteriorly,

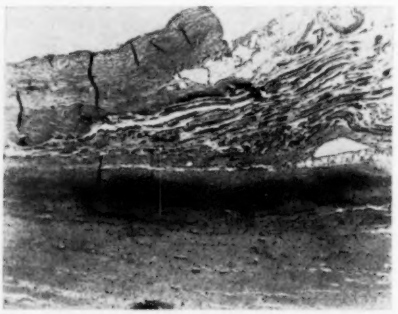

FIG. 25—Hemorrhage is seen within the dura at the orbital opening of the optic canal. No hemorrhage was found in the canal.

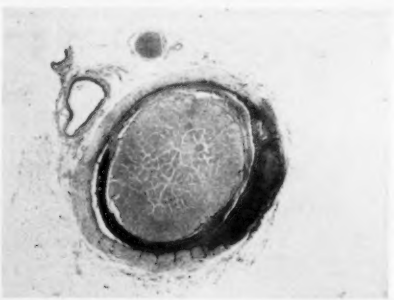

FIG. 26—A more anterior cross section showing intradural, subdural and subarachnoid hemorrhage.

blood appeared in the subdural and subarachnoid spaces. Anterior to the crossing of the central vessels, hemorrhage predominated in the subdural space. In both cases scattered hemorrhage was seen on the outer surface of the dura. In one case, hemorrhage was present in the substance of the chiasm in close asso-

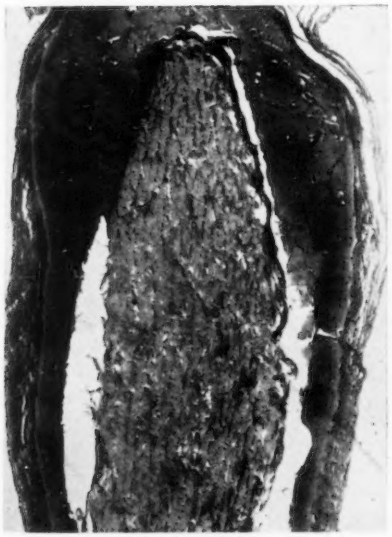

FIG. 27—A longitudinal section at the anterior end of the optic nerve. The differentiation between subdural and subarachnoid hemorrhage is shown clearly.

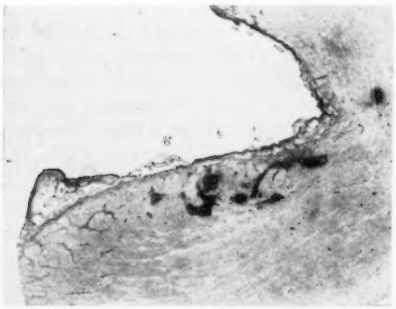

FIG. 28—Hemorrhage within the optic chiasm.

ciation with venous channels which had ruptured (fig. 28).

SUMMARY OF OBSERVATIONS

1. Intraneural hemorrhage was observed within the chiasm in 1 case, and in 2 cases hemorrhage was present in the substance of the third nerve in the cavernous sinus. Hemorrhage within the third nerve in both cases was associated with hemorrhage in the dura about the nerve, and in one of these cases the hemorrhage extended several millimeters into the orbit. In the other case, the perineural hemorrhage stopped at the superior orbital fissure.

2. Of 6 canals studied in cases of spontaneous intracranial subarachnoid hemorrhage, there was 1 case in which hemorrhage was absent in the canal and in the orbit. In 2 cases no hemorrhage was found in the optic canal, but there was extensive hemorrhage in the orbital optic nerve sheaths and in one of these there was a massive intraocular subhyaloid hemorrhage. In 2 cases there was minimal hemorrhage in the canal with a moderate amount of optic nerve sheath hemorrhage in the orbit. In 1 case considerable hemorrhage was present in the meningeal spaces within the canal, anterior to the cranial entrance of the ophthalmic artery into the canal, and in this case there was massive hemorrhage within the orbital optic nerve sheaths.

3. Hemorrhages were seen within the optic nerve in the canal in 2 cases. The orbital optic nerve was never so affected.

4. Where intraneural hemorrhages occurred in the intracanalicular portion of the nerve, a dilated vein was seen at the center of the nerve in 1 case. It communicated with the subarachnoid space in the canal. It could be followed forward in the center of the nerve only for several millimeters where it divided into small branches.

5. At the cranial entrance to the canal, meningeal hemorrhage appeared anterior to the entrance of the ophthalmic artery and the accompanying venous channel. The hemorrhage could be followed forward into the orbit via the spaces in the canal. Additional hemorrhage could be identified as originating at various points in the dura from venous channels and these hemorrhages

communicated with the subdural space. There was no hemorrhage present about the intracranial portion of the optic nerve.

6. At the orbital opening of the canal, large intradural hemorrhages were observed. These hemorrhages arose from ruptured veins in the dura and communicated with the subdural and epidural spaces. This was a predominant finding in 5 of the 6 cases of optic nerve sheath hemorrhage.

7. Large intradural hemorrhages were seen at the region of entrance of the central vessels into the dura. Such hemorrhages communicated with the subdural space.

8. Subarachnoid hemorrhage occurred in varying amounts in 4 of the 6 cases throughout the course of the nerve. When subarachnoid hemorrhage was extensive, it was found just posterior to the globe.

9. Orbital hemorrhages were seen principally at the apex of the orbit. The hemorrhages surrounded orbital nerves and vessels and were scattered through the orbital fat.

CONCLUSIONS

Our interpretation of the observations which have been recorded suggests that optic nerve sheath hemorrhages do not originate as a result of forward passage of blood from the intracranial meningeal spaces. If there is passage of blood through the optic canal, it is extremely small in amount. Optic nerve sheath hemorrhages originate in rupture of venous channels in the dura. It follows that subdural hemorrhages are relatively more frequent than are subarachnoid hemorrhages, and it is our belief that both have the same origin. Local rupture of veins accounts for the hemorrhages which occur in the cranial nerves in the cavernous sinus, optic chiasm, intracanalicular portion of the optic nerve, orbital dura at the entrance or exit of vessels, and throughout the orbital tissues. The presence of hemorrhage about the nerves within the cavernous sinus, and the extension of such hemorrhage through the superior orbital fissure via the perineural spaces and dura into the orbit, is a manifestation of increased venous pressure which is transmitted from the cranium to the orbit. Increased venous pressure is present in the orbital veins. Hemorrhages occur where the supporting structure of vessels is altered, as where vsesels pass from the optic canal into the orbit and at their entrance or exit from the dura. At such points, it would be anticipated that veins under increased pressure would rupture, and this is what we have found. Undoubtedly, the degree and extent of such ruptures depend on the rapidity and magnitude of elevation of venous pressure.

PART II

This part of the paper is devoted to an analysis of 180 cases of hemorrhage into the optic nerve sheaths. These cases were studied with the principal purpose of determining the relationship between hemorrhage in the optic nerve sheaths and intracranial hemorrhage. Also, it seemed opportune to correlate the occurrence of retinal hemorrhages and papilledema with intracranial hemorrhage.

OPTIC NERVE SHEATH HEMORRHAGE AND ITS RELATION TO ASSOCIATED INTRACRANIAL AND INTRAOCULAR HEMORRHAGE

This series includes all the cases of optic nerve sheath hemorrhages observed over a 27-year period in the pathology department of the Wilmer Ophthalmological Institute.

In each case a review of the clinical history was made, with special references to cerebral and ocular symptoma-

tology, to important physical and laboratory findings, as well as autopsy findings. In all instances the optic nerve had been severed anterior to the crossing of the central vessels from the dura to the nerve. The location and extent of the intracranial and optic nerve sheath hemorrhages were noted, and also the presence or absence of cerebral edema, papilledema, retinal or subhyaloid hemorrhages. Flattening of the convolutions and the presence of a pressure conus were the criteria used as evidence of cerebral edema.

The cases were divided into four main groups based on the nature of the intracranial lesions: (1) spontaneous intracranial subarachnoid hemorrhage (90 cases); (2) intracranial hemorrhage following cranial operation (64 cases); (3) intracranial hemorrhage due to skull fracture (16 cases); and (4) spontaneous subdural hemorrhage (10 cases).

The optic nerve sheath hemorrhage in each case was studied with regard to its location (subdural, subarachnoid, or both) and amount. In most instances the degree and extent of the sheath hemorrhage was proportional to its location, in that when the blood was confined to the subdural space it was usually minimal in amount. As the amount of hemorrhage increased, subarachnoid blood became more evident, especially in the subarachnoid space immediately

TABLE I

GROUP I—OBSERVATIONS ON 90 CASES OF SPONTANEOUS INTERCRANIAL SUBARACHNOID HEMORRHAGE

The Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	SLOW ONSET	INTERMEDIATE ONSET	RAPID ONSET
Subdural (12 cases)	6	3	3
Subdural with slight subarachnoid (45 cases)	14	15	16
Equally distributed in both the subdural and subarachnoid spaces (33 cases)	1	13	20

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	3	9	2	10	3	9	2	10
Subdural with slight subarachnoid	18	27	20	25	11	34	12	33
Equally distributed in both the subdural and subarachnoid spaces	27	6	27	6	23	10	18	15

behind the globe. When both spaces were filled with blood, the hemorrhage was of maximum severity.

Group I. Optic Nerve Sheath Hemorrhage Associated with Spontaneous Subarachnoid Hemorrhage

The 90 cases in this group include 39 (43 per cent) due to ruptured aneurysm, 41 (46 per cent) associated with spontaneous subarachnoid hemorrhage without demonstration of aneurysm, 5 with thrombosis of cerebral vessels, 3 with ventriculography, and 2 with metastatic tumor. Although intracranial hemorrhage was present in all cases, the hemorrhage may have been primarily intracerebral or intraventricular in some of them. The table which follows summarizes the findings in this group.

Examination of table I, which summarizes our observations on cases of cerebral subarachnoid hemorrhage, justifies the following observations.

1. Whereas the intracranial hemorrhages were in all cases subarachnoid, the optic nerve sheath hemorrhages were predominantly subdural in over 60 per cent of the cases. In no single instance was blood confined to the subarachnoid space, as might be anticipated if the cerebral subarachnoid space and that about the optic nerve were in direct communication.

2. The degree and extent of the hemorrhage about the optic nerve was proportional to the rapidity of the onset of clinical symptoms prior to death.

3. The frequency of occurrence of papilledema, retinal and subhyaloid hemorrhages, and cerebral edema increased proportionately with the degree and extent of the optic nerve sheath hemorrhages.

4. The situation of the intracranial hemorrhage did not influence the location or amount of hemorrhage about the optic nerve. Of greater importance than the location of the intracranial hemorrhage was the rapidity of onset and the size of the vessel ruptured.

5. Retinal subhyaloid hemorrhage occurred frequently (33 per cent of the cases). In 2 cases it was possible to demonstrate that the intraocular hemorrhages originated from rupture of the central retinal vein anterior to the lam-

FIG. 29—Preretinal (subhyaloid) hemorrhage is shown originating from rupture of the central retinal vein.

FIG. 30—A second case showed the origin of subhyaloid hemorrhage through venous rupture.

TABLE II

GROUP II—OBSERVATIONS ON 64 CASES OF INTRACRANIAL HEMORRHAGE FOLLOWING CRANIAL OPERATION

Location of Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	OPERATIVE SITE ONLY	PREDOMINANTLY SUBARACHNOID	PREDOMINANTLY SUBDURAL
Subdural (15 cases)	7	6	2
Subdural with slight subarachnoid (35 cases)	10	24	1
Equally distributed in both the subdural and subarachnoid spaces (14 cases)	5	7	2

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	4	11	3	12	1	14	5	10
Subdural with slight subarachnoid	12	23	18	17	4	31	3	32
Equally distributed in both the subdural and subarachnoid spaces	9	5	10	4	3	11	5	9

ina cribrosa (figs. 29 and 30). As regards other retinal hemorrhages, our observations have little or no value, and consequently these are not further considered other than to state that in all probability they more or less parallel the occurrence of subhyaloid hemorrhages.

Group II. Optic Nerve Sheath Hemorrhage Associated with Intracranial Hemorrhage Following Cranial Operation

The 64 cases in this group were placed in three subgroups based on the site of cranial operation: (1) operations on the cerebral hemispheres (22 cases); (2) operations about the sella turcica (18 cases); and (3) operations in the posterior fossae (24 cases). In each of these subgroups the cases were evaluated according to the location of the intracranial hemorrhage. The hemorrhage was limited to the operative site in 22 cases (34 per cent), was predominantly subarachnoid in 37 (57 per cent), and was mainly subdural in 5 cases (8 per cent).

Table II includes the observations on the entire series of 64 cases. Tables III, IV and V give a detailed account of the observations in the three subgroups.

Examination of tables II through V summarizes our studies of optic nerve sheath hemorrhages associated with in-

TABLE III

OPERATIONS ON THE CEREBRAL HEMISPHERES—22 cases

Location of Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	OPERATIVE SITE ONLY	PREDOMINANTLY SUBARACHNOID	PREDOMINANTLY SUBDURAL
Subdural (6 cases)	3	2	1
Subdural with slight subarachnoid (12 cases)	3	8	1
Equally distributed in both the subdural and subarachnoid spaces (4 cases)	2	1	1

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	2	4	1	5	0	6	0	6
Subdural with slight subarachnoid	8	4	7	5	2	10	2	10
Equally distributed in both the subdural and subarachnoid spaces	3	1	3	1	1	3	2	2

tracranial hemorrhage following operations on the brain.

1. Hemorrhages in the optic nerve sheaths varied widely as regards location and extent. Hemorrhage was predominantly subdural in a majority (78 per cent). In many instances intracranial hemorrhage was absent or minimal.

2. Massive optic nerve sheath hemorrhage was infrequent, which is in sharp contrast to what is seen in cases of spontaneous intracranial subarachnoid hemorrhage.

3. Cerebral edema, papilledema, retinal and subhyaloid hemorrhages occurred less often in this group than in group I (spontaneous subarachnoid hemorrhage).

As a corollary study of this group, we investigated all cases of papilledema available in the pathology department of the Wilmer Institute, with regard to the occurrence of optic nerve sheath hemorrhage. Two hundred twenty-seven cases of papilledema were found which were not associated with optic nerve sheath hemorrhage. Of these cases, 103 were examples of cerebral tumor in which operation was performed, and 30 were cases in which cerebral tumor was found at autopsy when no operation was done.

TABLE IV

OPERATIONS ABOUT THE SELLA TURCICA—18 cases

Location of Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	OPERATIVE SITE ONLY	PREDOMINANTLY SUBARACHNOID	PREDOMINANTLY SUBDURAL
Subdural (6 cases)	2	3	1
Subdural with slight subarachnoid (9 cases)	4	5	0
Equally distributed in both the subdural and subarachnoid spaces (3 cases)	1	1	1

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		OPTIC ATROPHY		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	1	5	0	6	5	1	0	6	5	1
Subdural with slight subarachnoid	1	8	1	8	6	2	0	8	0	8
Equally distributed in both the subdural and subarachnoid spaces	1	2	1	2	1	2	0	3	1	2

Group III. Optic Nerve Sheath Hemorrhage Following Fracture of the Skull

Only 16 cases fell into this group. These cases were analyzed in the same manner as the groups already considered.

In this group the following observations were made.

1. Optic nerve sheath hemorrhage was predominantly subdural (10 of 16 cases—63 per cent).

2. It seemed remarkable that only a single subhyaloid hemorrhage was observed.

3. Cerebral edema, papilledema, retinal and subhyaloid hemorrhages occurred infrequently.

Group IV. Optic Nerve Sheath Hemorrhage Associated with Spontaneous Intracranial Subdural Hemorrhage

Of the 10 cases in this group, 4 were associated with a primary blood dyscrasia, 3 were due to cerebral trauma without fracture of the skull, and 3 were of unknown origin.

The following observations were made on this group of cases.

1. Subdural hemorrhage was predominant in the cranium and about the optic nerve.

2. Cerebral edema, papilledema, and retinal hemorrhages occurred infrequently.

TABLE V

OPERATIONS IN THE POSTERIOR FOSSA—24 cases

Location of Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	OPERATIVE SITE ONLY	PREDOMINANTLY SUBARACHNOID
Subdural (3 cases)	2	1
Subdural with slight subarachnoid (14 cases)	3	11
Equally distributed in both the subdural and subarachnoid spaces (7 cases)	2	5

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	1	2	2	1	1	2	0	3
Subdural with slight subarachnoid	3	11	10	4	2	12	1	13
Equally distributed in both the subdural and subarachnoid spaces	5	2	6	1	2	5	2	5

SUMMARY OF OBSERVATIONS ON THE ANTERIOR OPTIC NERVE SHEATHS AND POSTERIOR SEGMENT OF THE EYE

1. It was noted in 90 cases of spontaneous intracranial subarachnoid hemorrhage that the optic nerve sheath hemorrhage (in the anterior portion of the nerve) was predominantly subdural. Some explanation was necessary to explain the difference in location of the hemorrhage about the brain and optic nerve if these hemorrhages were continuous.

2. In many of the cases of optic nerve sheath hemorrhage associated with cranial operations, there was little or no intracranial meningeal hemorrhage, and yet hemorrhage was present in the optic nerve sheath in each instance. It is evident that hemorrhage into the optic nerve sheaths can exist in the absence of intracranial hemorrhage.

3. In spontaneous intracranial subarachnoid hemorrhage, the position and extent of the hemorrhage about the optic nerve and the frequency of retinal and subhyaloid hemorrhage varied directly with the severity of the cerebrovascular accident and the presence or absence of cerebral edema.

4. In 64 cases associated with cranial operation, 16 cases of skull fracture, and 10 cases of spontaneous subdural

TABLE VI

GROUP 3—OBSERVATIONS ON 16 CASES OF INTRACRANIAL HEMORRHAGE FOLLOWING SKULL FRACTURE

Location of Intracranial Hemorrhage

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	SUBDURAL AND SUBARACHNOID	PREDOMINANTLY SUBARACHNOID	PREDOMINANTLY SUBDURAL
Subdural (6 cases)	4	1	1
Subdural with slight subarachnoid (4 cases)	4	0	0
Equally distributed in both the subdural and subarachnoid spaces (6 cases)	3	1	2

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	1	5	1	5	0	6	0	6
Subdural with slight subarachnoid	0	4	1	3	0	4	0	4
Equally distributed in both the subdural and subarachnoid spaces	1	5	3	3	0	6	1	5

intracranial hemorrhage, cerebral edema was not frequent at autopsy. Massive sheath hemorrhage, retinal and subhyaloid hemorrhages occurred infrequently in these cases, thus confirming the correlation between the presence of cerebral edema and the degree and extent of optic nerve sheath and retinal hemorrhages.

5. Seventy-five per cent of the subhyaloid hemorrhages found in the entire series were in those cases associated with spontaneous intracranial subarachnoid hemorrhage. In 2 cases the subhyaloid hemorrhages were found to be due to rupture of the central retinal vein anterior to the lamina cribrosa.

CONCLUSIONS

Optic nerve sheath hemorrhages may be subdural or subarachnoid, or both spaces may contain blood. In some instances the blood is intradural. Part II of this study indicates that subdural hemorrhages predominate in the optic nerve sheaths, anterior to the entrance of the central retinal vessels.

Optic nerve sheath hemorrhages may occur in the absence of intracranial meningeal bleeding.

Rupture of veins is the source of the optic nerve sheath hemorrhage, as well as intraocular and intraorbital hemorrhages.

TABLE VII

GROUP 4—OBSERVATIONS OF 10 CASES OF SPONTANEOUS INTRACRANIAL SUBDURAL HEMORRHAGE

Clinical Symptomatology

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	SLOW ONSET	INTERMEDIATE ONSET	RAPID ONSET
Subdural (3 cases)	2	1	0
Subdural with slight subarachnoid (5 cases)	3	2	0
Equally distributed in the subdural and subarachnoid spaces (2 cases)	2	0	0

Associated Abnormal Findings

LOCATION OF OPTIC NERVE SHEATH HEMORRHAGE	CEREBRAL EDEMA		PAPILLEDEMA		RETINAL HEMORRHAGES		SUBHYALOID HEMORRHAGES	
	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT	PRESENT	ABSENT
Subdural	1	2	2	1	0	3	1	2
Subdural with slight subarachnoid	0	5	0	5	1	4	0	5
Equally distributed in the subdural and subarachnoid spaces	1	1	0	2	0	2	0	2

COMMENT AND SUMMATION

In 1906 Liebrecht[10] reported 26 cases of skull fracture, of which 14 had hemorrhages in the optic nerve sheaths. He was probably the first investigator to do serial sections through the posterior and intracanalicular portions of the optic nerve. In general, the findings reported in six cases in this communication, are similar to those recorded by Liebrecht. He concluded that hemorrhages within the optic nerve sheaths about the optic nerve originated (1) by way of perivascular lymph channels, (2) by rupture of vessels in the optic nerve sheath and (3) in exceptional cases, by direct continuity between the spaces about the brain and those about the optic nerve.

In 1936 Behr[2] described the anatomy of the optic nerve, paying particular attention to the septa in and about the nerve and its blood supply. Illustrations which are included in his paper are strikingly similar to those which we have selected from our material.

In 1943 Ballantyne[1] studied optic nerve sheath hemorrhages in 5 cases of spontaneous intracranial subarachnoid hemorrhage. Serial sections through the canal were studied in 2 cases. He found absence of hemorrhage in the optic canal but observed isolated hemorrhages in the dura, retro-orbital

tissues and meningeal spaces about the optic nerve and in the chiasm. He demonstrated ruptured veins as the source of these hemorrhages. It was his opinion that there is little if any free flow of blood through the optic canal from the cranial meningeal spaces to the orbital optic nerve sheath spaces.

Our observations and conclusions, which have already been stated, are in essential agreement with those described by Liebrecht, Behr and Ballantyne. It seemed necessary to describe first our studies on the optic canal, which made up Part I of this paper. Part II concerned anterior orbital sections of the optic nerve and the posterior segment of the eye. It is now necessary only to correlate Parts I and II by stating what we consider the facts of importance.

Optic nerve sheath hemorrhages originate in rupture of veins or venous channels in the dura. Such hemorrhages are found in the dura within the cavernous sinus and in the canal, and are regularly pronounced in many cases at the orbital opening of the canal. Further anterior, they tend to reach the subdural and subarachnoid spaces but predominate in the former.

The pattern of optic nerve sheath hemorrhage which is outlined above, the observation of intraneural hemorrhage (third nerve, optic nerve, chiasm), and the further observation of subhyaloid retinal bleeding, originating from rupture of the central retinal veins, establish beyond question the presence of increased venous pressure which is transmitted from the cranial cavity to the orbital veins. Scattered intraorbital hemorrhages are further proof of such pressure. The degree and extent of venous ruptures are dependent on the rapidity of onset and the magnitude of elevation of venous pressure in the brain and orbit.

Our studies establish as fact that there is little if any extension of hemorrhage via the optic canal. Furthermore, optic nerve sheath hemorrhages are seen in the absence of intracranial bleeding.

The observation of intraneural bleeding associated with hemorrhages in the optic nerve sheath raises many clinical possibilities which are not considered in this communication. Indeed, in a similar manner, the principal finding that increased venous pressure and venous rupture accounts for optic nerve sheath hemorrhages may be of vital importance, as for example in papilledema.

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Highlights of the Fifty-Fifth Annual Meeting

THE American Academy of Ophthalmology and Otolaryngology held its fifty-fifth annual meeting at the Palmer House, Chicago, Oct. 8 to 13, 1950. Registration of members, guests, exhibitors, and ladies totaled 4783, approximately the same number as attended the 1949 meeting.

Advance ticket orders for the instruction courses totaled 1167. Because of the sustained demand for the instruction program, a number of courses were scheduled in a large lecture room on the Club Floor in an effort to relieve the congestion in the classrooms.

An excellent program had been arranged for the scientific sessions in the Grand Ball Room, and it met with the enthusiastic approval of the capacity crowds which attended. One of the outstanding features of the program was the first showing of the recently completed film, "Embryology of the Eye," which was financed by the Academy. There is already a large demand for copies of this film.

Among the distinguished guests present at the meeting were Dr. George W. Corner, director of the Carnegie Institution of Washington, which had made available from its Department of Embryology the material used in the film, and Dr. George K. Smelser, professor of anatomy at Columbia University, who served as technical advisor in the production of the film. The Academy's Guest of Honor was Dr. John D. Kernan, professor emeritus of otolaryngology, Columbia University College of Physicians and Surgeons, New York City.

SOCIAL FUNCTIONS

At the President's reception, held Sunday afternoon, October 8, in the Grand Ball Room, members and guests were received by the General Chairman on Arrangements, Dr. John R. Lindsay, and Mrs. Lindsay; the President, Dr. J. Mackenzie Brown; the Guest of Honor, Dr. John D. Kernan, and Mrs. Kernan; and the President-Elect, Dr. Derrick Vail, and Mrs. Vail.

More than forty hospital and university groups held alumni dinners on Monday evening preceding the annual Academy smoker held in the Grand Ball Room later in the evening. At the smoker, entertainment, refreshments and music for dancing combined to make a most enjoyable occasion.

The annual Academy dinner was held in the Grand Ball Room on Wednesday evening. Seated at the speaker's table were Dr. J. Mackenzie Brown, Dr. John D. Kernan and Mrs. Kernan, Dr. Derrick Vail and Mrs. Vail, Dr. Edwin B. Dunphy and Mrs. Dunphy, Dr. Kenneth Craft, Dr. James Mason Baird and Mrs. Baird, Dr. James M. Robb and Mrs. Robb, Dr. George W. Corner, Dr. George K. Smelser, and Dr. Payson Wild, vice-president and dean of the faculties of Northwestern University, who read the speech prepared by Dr. J. Roscoe Miller, president of Northwestern University, who had been called out of the country on University business. Awards of Merit were presented to Dr. Kernan, Dr. Corner, and Dr. Smelser. Announcement was made of awards to scientific exhibitors. Honor keys were presented to Drs. James H. Allen, Milton L. Berliner, Harold W. Brown, Bayard T. Horton, William C. Huffman, John M. McLean, Henry B. Orton, E. W. Scheldrup, L. M. Sellers, and Fletcher D. Woodward for their years of service in the instruction program and the home study courses.

Other social functions sponsored by the Academy were the exhibitors luncheon tendered to the commercial firms exhibiting at the convention, the luncheon for the faculty of the Home Study Courses, and the faculty luncheon honoring all those participating in the scientific program, scientific exhibits, and instruction courses.

Mrs. John R. Lindsay, chairman of the ladies' committee, has announced that her committee registered 857 wives of Academy members and guests during the meeting. These guests of the Academy were entertained with tours of the Museum of Science and Industry and the University of Chicago campus, with tea at the Quadrangle Club and entertainment provided by the University of Chicago Acrotheatre and the Varsity Gymnastic Team. A delightful luncheon at the Drake Hotel was followed by a historical fashion show.

SCIENTIFIC EXHIBIT AWARDS

Six awards were presented by the Academy to participants in the scientific exhibit.

Otolaryngology — First place was awarded to Dr. Gordon B. New, Mayo Clinic, Rochester, Minn., and co-exhibitors, Dr. John B. Erich and Dr. K. D. Devine (by invitation), for their exhibit on "Cancers of the Mouth." The second award went to Dr. J. Brown Farrior of Tampa, Fla., for his exhibit of "Roentgen Anatomy of the Petrous Pyramid and Mastoid." Dr. Linden J. Wallner of the Municipal Tuberculosis Sanitarium of Chicago, and his co-exhibitors, Dr. George C. Turner (by invitation), Dr. Meyer Lichtenstein (by invitation) and Dr. H. C. Sweany (by invitation), received the third award for their exhibit showing "The Treatment of Tuberculosis of the Larynx by Chemotherapy."

Ophthalmology — The first award went to Dr. David D. Donaldson (by invitation) of the Howe Laboratory, Harvard University, and co-exhibitor, Dr. David G. Cogan, for their exhibit of "Stereophotographs of the Anterior Segment of the Eye." Dr. Abraham L. Kornzweig of New York received the second award for his exhibit dealing with "Pathology of the Eye in Old Age." The third award was presented to Dr. Brendan D. Leahey of the Massachusetts Eye and Ear Infirmary, Low-

ell, Mass., for his exhibit, "Transplantation of the Cornea."

Special mention was given to Dr. William L. Benedict, Mayo Clinic, Rochester, Minn., and his co-exhibitors, Dr. Edith M. Parkhill (by invitation) and Dr. Joseph J. Groom (by invitation), for the exhibit, "Gliomas of the Retina." Special mention also went to Dr. Frederick H. Theodore, Mt. Sinai Hospital, New York, for his exhibit on "Office Bacteriology of the Eye."

SPECIAL SCIENTIFIC PROGRAMS

Special groups and committees affiliated with the Academy conducted programs during convention week. On Saturday evening, October 7, the Otosclerosis Study Group, a division of the Committee on Conservation of Hearing, presented reports on "Histologic Observations on Fenestrated Human Ears" and "Causes for Failure in Fenestration Surgery." The Committee and the Otosclerosis Group conducted a second meeting on Sunday evening.

The Joint Committee on Industrial Ophthalmology keyed its program to the theme, "Eyes and Disaster." Speakers were Dr. Andrew C. Ivy, vice-president of the University of Illinois School of Medicine; Col. Victor A. Byrnes (MC), School of Aviation Medicine, Randolph Field, Texas; and Dr. Hedwig S. Kuhn, secretary of the Committee.

At the joint meeting arranged by the American Orthoptic Council and the American Association of Orthoptic Technicians the following subjects were discussed: "Scope and Limitations of Orthoptics in the Nonsurgical Treatment of Ocular Deviations," "The Orthoptist and Hyperphoria," and "Surgical Treatment of Ocular Deviations: An Important Factor in Orthoptics."

The American Society of Ophthalmologic and Otolaryngologic Allergy chose for discussion at their initial joint program, the history and future of ophthalmic and otolaryngologic allergy and the diagnosis and management of food allergy.

Most of the papers given at these special programs will appear in future issues of the TRANSACTIONS or in supplements to the TRANSACTIONS.

OFFICERS

Dr. Derrick Vail, professor of ophthalmology at Northwestern University and editor-in-chief of the *American Journal of Ophthalmology*, will become President of the Academy on January 1, 1951. Dr. Vail has been a member of the Academy since 1931. He has served as a Councillor from 1941 to 1945, and in 1948 he was chairman of a very popular symposium on primary glaucoma presented on the scientific program. He has participated frequently in the Academy's instruction program.

Dr. James M. Robb, professor of clinical otolaryngology at the Wayne University College of Medicine in Detroit, was named President-Elect of the Academy at the business meeting held on Thursday afternoon. Dr. Robb became a member of the Academy in 1937. He was a Councillor of the Academy from 1944 to 1948 and has always been generous of his time and efforts on behalf of the Academy.

Other officers elected to serve in 1951 are: Dr. Francis E. LeJeune of New Orleans, First Vice-President; Dr. Peter Kronfeld of Chicago, Second Vice-President; Dr. Frederick A. Figi of Rochester, Minn., Third Vice-President; Dr. Howard House of Los Angeles, Secretary for Otolaryngology; and Dr. John H. Dunnington of New York, Councillor for a term of four years.

The following officers were re-elected: Dr. William L. Benedict, Executive

Secretary-Treasurer and Editor-in-Chief of the TRANSACTIONS; Dr. Algernon B. Reese, Secretary for Ophthalmology; Dr. A. D. Ruedemann, Secretary for Instruction in Ophthalmology; Dr. Dean M. Lierle, Secretary for Instruction in Otolaryngology and Maxillofacial Surgery; Dr. Lawrence R. Boies, Secretary for Home Study Courses; and Dr. Erling W. Hansen, Secretary for Public Relations.

CHICAGO — 1951

The 1951 meeting of the American Academy of Ophthalmology and Otolaryngology will be held at the Palmer House in Chicago. The dates will be October 14 to 19.

In Memoriam

Herman Edward Kully.....Omaha, Nebraska
September 19, 1950

William Lowndes McDougall.....Atlanta, Georgia
July 18, 1950

Harry C. Messinger.....Providence, Rhode Island
August 2, 1950

Robert F. Ridpath.....Philadelphia, Pennsylvania
August 10, 1950

Ralph Edward Russell.....Ocala, Florida
August 16, 1950

Necrology

IN MEMORIAM

Francis J. Arnold, Burlington, Vt.
David Franklin Berry, Indianapolis, Ind.
William Byron Black, Kansas City, Mo.
Nora Brodboll Brandenburg, Chicago, Ill.
Frank Joseph Briglia, Philadelphia, Pa.
Thomas A. Burke, Cleveland, Ohio
Elwyn Temple Butterfield, Las Vegas, N. M.
Albert Arthur Carter, Boston, Mass.
Joseph William Charles, St. Louis, Mo.
William David Donoher, Los Angeles, Calif.
Samuel Abraham Durr, San Diego, Calif.
John Winston Fowlkes, Jr., New York, N. Y.
Harry Friedenwald, Baltimore, Md.
Theron Earl Fuller, Texarkana, Texas
M. Jean Gale, Denver, Colo.
Harry Searls Gradle, Sherman Oaks, Calif.
Wright Platt Hewitt, Cambridge, Mass.
Reuben Paul Higgins, Cortland, N. Y.
Emerson Stanley Hill, Torrington, Conn.
Joseph William Howard, Kansas City, Mo.
William Henry Howard, Oelwein, Iowa
Westley Marshall Hunt, New York, N. Y.
Reuben Kayser, Brooklyn, N. Y.
Charles Fawcett Kutscher, Pittsburgh, Pa.
Charles Alfonzo Leavy, St. Louis, Mo.
Edward Laurel Lingeman, Indianapolis, Ind.
John Marion Lore, New York, N. Y.
Justus Abner Matthews, Minneapolis, Minn.
Albert George McAuley, Montreal, Quebec, Can.
Clyde Elliott McDannald, New York, N. Y.
Nathan Davis McDowell, Rochester, N. Y.
Roy Carlyle McLaughlin, Los Angeles, Calif.
Sterling Frederic Mengel, Pottsville, Pa.
Willis O. Nance, Chicago, Ill.
Ezra Eugene Neff, Madison, Wis.
Thomas Phillip O'Connor, Chicago, Ill.
James Timothy O'Hora, Detroit, Mich.
Joseph Greeley Parsons, Crookston, Minn.
Harvey Ollis Randel, Oklahoma City, Okla.
Simon Harry Ratner, Miami Beach, Fla.
Robert Eldon Repass, Miami, Fla.
John Henry Rindlaub, Fargo, N. D.
Charles Arthur Ringle, La Junta, Colo.
Clarence Rubendall, Omaha, Neb.
Maxwell Donnell Ryan, New York, N. Y.
Orlando Peter Schoofs, Milwaukee, Wis.
John Arthur Spengler, Geneva, N. Y.
Frederick G. Stueber, Lima, Ohio
Gideon McDonald Van Poole, Honolulu, T. H.
Crville Jackson Walker, Youngstown, Ohio
David Washburn Wells, West Newton, Mass.
Horace James Williams, Philadelphia, Pa.
Norman Lee Woodry, Detroit, Mich.

FRANCIS J. ARNOLD

Dr. Francis J. Arnold was born in South Burlington, Vt., Oct. 10, 1872. He received his medical degree from the University of Vermont College of Medicine in 1901.

Dr. Arnold was on the staffs of Mary Fletcher, Bishop DeGoesbriand Memorial, and Fanny Allen hospitals. He was also on the staff of the Providence Orphan Asylum and Hospital in Burlington.

A Life Fellow of the American Academy of Ophthalmology and Otolaryngology, Dr. Arnold was a fellow of the American Medical Association and a member of the New England Oto-Laryngological Society, the Vermont State Medical Society and the Chittenden County Medical Society.

Dr. Arnold died Aug. 19, 1950.

DAVID FRANKLIN BERRY

Dr. David Franklin Berry, who was born in Franklin, Ind., died in Indianapolis on March 17, 1950, at the age of 76.

Dr. Berry was a graduate of the old Central College of Physicians and Surgeons in Indianapolis and was awarded the John M. Gaston gold surgery medal for proficiency in his studies. He was a pharmacist for several years before he entered the practice of medicine.

After postgraduate work in American and European clinics, Dr. Berry began the practice of medicine in Indianapolis. For many years he served on the staffs of the Indianapolis City, the Methodist and St. Vincent's hospitals and devoted a great deal of time to charitable work.

A specialist certified by the American Board of Otolaryngology, Dr. Berry was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, a member of the Indianapolis Medical Society, the Indiana State Medical Association and the American Medical Association.

Dr. Berry is survived by his wife, Mrs. Nettie Fergason Berry, and a sister.

WILLIAM BYRON BLACK

Dr. William Byron Black was born in Windsor, Mo., on April 16, 1892. He received his medical degree from the University of Kansas Medical school in 1922.

Dr. Black was a specialist certified by the American Board of Otolaryngology. He was affiliated with the Menorah Hospital and St. Joseph's Hospital in Kansas City, Mo. A Fellow of the American College of Surgeons, the American Academy of Ophthalmology and Otolaryngology, the American Laryngological, Rhinological and Otological Society and the American College of Allergists, of which he was a member of the board of regents, Dr. Black was also president of the Hansel Foundation and a member of the Missouri State Medical Association. From 1941 to 1946 he was secretary-treasurer and, in 1947, president of the American Society of Ophthalmologic and Otolaryngologic Allergy. He was a past-president and secretary-treasurer of the Kansas City Society of Ophthalmology and Otolaryngology, founder and past-president of the Kansas City Anatomical Society, fellow and member of the founders group of the International Association of Allergists, a member of the Southern Medical Association, and of the Kansas City Southwest Clinical Society.

Dr. Black died on Oct. 23, 1949, and is survived by his wife, Helen T. Black, and two sons, Durrill M. Black, Johnstown, Colo., and William Byron Black, Jr., Houston, Texas.

NORA FLORENCE BRODBOLL BRANDENBURG

Dr. Nora Brandenburg was born July 10, 1900, in Lindsay, Neb. She received her medical degree from the University of Illinois College of Medicine in 1925 and did postgraduate work at Rush Medical College and the University of Vienna. She also studied under Chevalier Jackson.

In 1926 Dr. Brandenburg began the practice of medicine in Chicago. She was on the staff of Wesley Memorial and Presbyterian hospitals, an instructor at Rush Medical College and the University of Chicago, and an instructor and assistant professor at the Northwestern University Medical School.

Dr. Brandenburg was a specialist certified by the American Board of Otolaryngology, a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Surgeons, and the American Medical Association, and a member of the Chicago Medical Society, and the American Medical Women's Association.

Dr. Brandenburg died May 31, 1950, in Chicago. She is survived by her husband, John V. Johansen.

FRANK JOSEPH BRIGLIA

Dr. Frank Joseph Briglia, who was born in Philadelphia, Oct. 12, 1903, died in his native city on April 5, 1950. He was a graduate of St. Joseph's College and received his medical degree from the Jefferson Medical College in Philadelphia. In 1930 he began the practice of medicine in Philadelphia.

A specialist certified by the American Board of Otolaryngology, Dr. Briglia was a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, and a member of the Philadelphia County Medical Society, the Medical Society of the State of Pennsylvania, the Philadelphia Laryngological Society, the American Association for the Advancement of Science, the Philadelphia Medical Club, and a life member of the Jefferson Medical School Alumni.

At the time of his death, Dr. Briglia was an instructor in laryngology at the University of Pennsylvania Graduate School of Medicine and was affiliated with the Graduate Hospital of the University of Pennsylvania.

THOMAS A. BURKE

Dr. Thomas A. Burke, born on April 18, 1864, died in Duluth, Minn., on July 18, 1949.

Dr. Burke was a graduate of Canisius College of Buffalo and received his medical degree from the Western Reserve University Medical Department of Cleveland in 1888. His postgraduate work was done in New York, Philadelphia, London and Vienna. Dr. Burke began the practice of medicine in 1896 in Cleveland. He was chief of the otolaryngologic service of Charity Hospital, Cleveland, Ohio.

Dr. Burke was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and a Fellow of the American Medical Association. Among his nonprofessional interests he took an active part in the Knights of Columbus, of which he was a Past Grand Knight.

Dr. Burke is survived by his wife, two daughters, Mrs. Allen Fritzsche, Elyria, Ohio, and Mrs. Clarence Maloney, Evanston, Ind., and one son, Thomas, who is the mayor of Cleveland.

ELWYN TEMPLE BUTTERFIELD

Dr. Elwyn Temple Butterfield was born Jan. 5, 1910, at Dallas Center, Iowa. He was a graduate of Grinnell College and received his medical degree from the State University of Iowa College of Medicine, Iowa City. He did postgraduate work at Tulane Medical School, New Orleans, La., where he taught in the Tulane Medical School and was on the staff of Charity Hospital and the Eye, Ear, Nose and Throat Hospital of New Orleans.

Dr. Butterfield began the practice of medicine in Dallas Center, Iowa, in 1938. He was affiliated with the Lutheran Hospital in Des Moines. After serving in World War II, he moved to Albuquerque, N. M., where he was a staff member of St. Joseph's Hospital, consultant at Santa Fe Hospital and the Veterans Hospital. From Albuquerque, he went to Las Vegas, N. M. A staff member at both the Las Vegas Hospital and St. Anthony's Hospital, he was also ophthalmologist for the Santa Fe Railroad.

A specialist certified by the American Board of Ophthalmology, Dr. Butterfield was a Fellow in the American Academy of Ophthalmology and Otolaryngology, and a member of the American Medical Association, the New Mexico State Medical Society, and San Miguel County Medical Society.

Dr. Butterfield died in Las Vegas, N. M., Jan. 22, 1950. He is survived by his wife, Carolyn M. Butterfield, and five children.

ALBERT ARTHUR CARTER

Dr. Albert Arthur Carter, who was born in 1874, died in Malden, Mass., June 23, 1950. In 1917 he received his medical degree from the Middlesex College of Medicine and Surgery in Cambridge, Mass.

Dr. Carter was affiliated with the Boston City Hospital, Massachusetts Eye and Ear Infirmary, and the Beth Israel Hospital.

A Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, Dr. Carter was a member of the New England Ophthalmological Society. He was a specialist certified by the American Board of Ophthalmology.

JOSEPH WILLIAM CHARLES

Dr. Joseph William Charles was born Feb. 9, 1868, in Booneville, Mo. He graduated from Westminster College, Fulton, Mo., and received his medical degree from

the Washington University School of Medicine, St. Louis. In November, 1894, he began postgraduate work, studying for two and one-half years in England, France and Germany under Virchow, Koch, Koenig, Heller, Voelker, Snellen, Javel and Tscherning. In 1897 he began the practice of medicine in St. Louis.

Dr. Charles was an instructor at the Washington University Eye Clinic, clinical professor of ophthalmology at Washington University, and on the staffs of St. Luke's and Missouri Baptist hospitals.

A specialist certified by the American Board of Ophthalmology and a Senior Fellow of the American Academy of Ophthalmology and Otolaryngology, Dr. Charles was also a member of the American Ophthalmological Society, of which he was a council member for five years. He was a fellow of the American College of Surgeons and the American Medical Association, and a member of the St. Louis Medical Society and the St. Louis Ophthalmological Society. He contributed frequently to the programs of these societies and published many valuable papers.

Dr. Charles died Feb. 10, 1950, in St. Louis. He is survived by his wife, Dorothy D. Charles.

WILLIAM DAVID DONOHER

Dr. William David Donoher, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died in Los Angeles, Calif., on Oct. 11, 1949.

Dr. Donoher was born in Fort Dodge, Iowa, in 1874. He received his medical degree from the St. Louis College of Physicians and Surgeons, St. Louis. His postgraduate work was done in Chicago, Boston, Philadelphia and London. He began the practice of medicine in Salt Lake City, Utah, where he remained for twenty-eight years. In 1933, he moved to Los Angeles, where he was practicing at the time of his death.

Dr. Donoher was a member and past president of the Pacific Coast Oto-Ophthalmological Society, past president of the Utah State Medical Association, a fellow of the American College of Surgeons, and a member of the American Medical Association, the Western Ophthalmological Society, and the Los Angeles County Medical Association.

Surviving Dr. Donoher are his wife, Edith Donoher, and a daughter.

SAMUEL ABRAHAM DURR

Dr. Samuel Abraham Durr was born May 5, 1894, in Chicago, Ill. He received his medical degree from the Northwestern University Medical School, Chicago, in 1918 and began the practice of medicine in San Diego, Calif., in 1920. His postgraduate work was done at the University of Pennsylvania Graduate School.

A specialist certified by the American Board of Ophthalmology, Dr. Durr was on the staffs of Mercy Hospital, San Diego, and Schripps Hospital, La Jolla.

Dr. Durr was a Fellow of the American Academy of Ophthalmology and Otolaryngology, a member of the American Medical Association, the California State Medical Society and the San Diego County Medical Society.

Dr. Durr died in San Diego on Dec. 4, 1949. He is survived by his wife and two daughters.

JOHN WINSTON FOWLKES, JR.

Dr. John Winston Fowlkes, Jr., was born in Amelia County, Va., Dec. 17, 1890. He received his medical degree from the University of Virginia Department of Medicine and did postgraduate work at the Staten Island Hospital, New York.

In 1919 Dr. Fowlkes began the practice of medicine in New York City, where he was on the staff of Bellevue Hospital until 1934. From 1923 until his death, Dr. Fowlkes was on the staff of St. Luke's Hospital. From 1934 to 1944, he was surgeon in charge of the otorhinolaryngologic service and from 1944 until his death, he was director of the otorhinolaryngologic service at St. Luke's. He was also consultant at the New York Nursery and Childs Hospital for 12 years, consultant at the New York Infirmary for Women and Children, and was affiliated with the Hackensack Hospital, New Jersey.

Dr. Fowlkes was a specialist certified by the American Board of Otolaryngology, a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American Laryngological, Rhinological and Otological Society and the American Medical Association, and a member of the New York Academy of Medicine, New York county and state medical societies, the New York Laryngological Society, and the New York Otolaryngological Society.

Dr. Fowlkes died Aug. 9, 1949, at Nantucket, Mass. He is survived by his wife and four children.

HARRY FRIEDENWALD

Dr. Harry Friedenwald, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died at his home in Baltimore, April 8, 1950, at the age of 85. Dr. Friedenwald was born in Baltimore Sept. 21, 1864. He received his medical degree from the College of Physicians and Surgeons in Baltimore in 1886. During the next two years he did postgraduate work in Vienna and Berlin.

In 1890 Dr. Friedenwald returned to this country and in 1894 became associate professor of ophthalmology and otology at the College of Physicians and Surgeons in Baltimore, where in 1902 he succeeded his father as professor. When this medical school was absorbed into the University of Maryland, he continued as professor of ophthalmology until 1929, when he became professor emeritus.

He was ophthalmic surgeon at the Baltimore Eye, Ear and Throat, Charity, Mercy, Sinai, and Union Memorial hospitals and the Hospital for Women.

A specialist certified by the American Board of Ophthalmology and the American Board of Otolaryngology, Dr. Friedenwald was a member of the American Ophthalmological Society, the American Otological Society and the Association for Research in Ophthalmology. In 1907 and 1908 he was a member of the House of Delegates of the American Medical Association, and in 1931-1932 chairman of the Section on Ophthalmology. He was an honorary fellow of the Jewish Academy of Arts and Science and a fellow of the American Association for the Advancement of Science and the American College of Surgeons. In 1930 he gave the honorary Doyne lecture at the Oxford Ophthalmological Congress and in 1941 delivered the fourth annual de Schweinitz Lecture before the Section on Ophthalmology of the College of Physicians of Philadelphia. He was president of the Hebrew Educational Society and the Federation of Jewish Charities, a member of the board of governors of Dropsie College in Philadelphia, and president of the Federation of American Zionists from 1904 to 1912. He was also chairman of the medical advisory board of Hadassah and director of the Jewish Theological Seminary of America.

A collector of rare manuscripts on medicine and valuable autographs, Dr. Friedenwald had presented his collection to a university in Palestine

Dr. Friedenwald is survived by a daughter, Mrs. Myer Strauss, and a son, Jonas S., also a member of the Academy.

THERON EARL FULLER

Dr. Theron Earl Fuller was born Jan. 2, 1885, in Clarksville, Texas. He received his medical degree from the Vanderbilt University School of Medicine in 1908. His postgraduate work was done at the New York Eye and Ear Infirmary and in Vienna.

A specialist certified by the American Boards of Ophthalmology and of Otolaryngology, Dr. Fuller began the practice of medicine in Texarkana, Texas, in 1908. He was a director and staff member of the Texarkana Hospital, consultant oculist and aurist at the St. Louis Southwestern Railway Hospital, and a staff member of the Texas and Railway Hospital Association.

Dr. Fuller was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American Laryngological, Rhinological and Otological Society, the American College of Surgeons, and the American Medical Association, and a member of the Arkansas and Texas Medical Society, and the Texas Society of Ophthalmology and Otolaryngology. He was also a director of the Texarkana National Bank.

Dr. Fuller died Feb. 1, 1950, in Texarkana. He is survived by his wife, Emeline Grim Fuller, and a son, William.

M. JEAN GALE

Dr. M. Jean Gale was born in Lancaster, Canada, Dec. 10, 1868. She moved to Philadelphia with her family in 1872. She received her medical degree from the Woman's Medical College of Pennsylvania in 1889.

In 1890 Dr. Gale began the practice of medicine in Boulder, Colo. Three years later she moved to Denver where, in addition to her own practice, she served on the staffs of Children's Hospital and the Industrial School for Girls at Morrison. She was the first woman oculist to practice in Denver.

Dr. Gale was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the American Medical Association, the Denver Medical Society and the Denver Ophthal-

mological Society.

Dr. Gale died Nov. 19, 1949, in Denver. She is survived by a sister, Mrs. H. J. Wiebking of Greeley, Colo., and a niece, Mrs. W. D. Pollock of Denver.

HARRY SEARLS GRADLE

Dr. Harry Searls Gradle, president of the American Academy of Ophthalmology and Otolaryngology in 1938, died at his home in Sherman Oaks, Calif., on May 25, 1950. Dr. Gradle was born in Chicago, Dec. 31, 1883. He graduated from the University of Michigan, Ann Arbor, in 1906 and from the Rush Medical College in Chicago in 1908. He did graduate work in eye clinics in London, Paris, Vienna, Berlin and Prague. He was assistant professor of ophthalmology at the University of Illinois College of Medicine from 1921 to 1927, professor in 1944-45, and extramural professor of ophthalmology at Northwestern Medical School from 1928 to 1944.

He was a member of the Council of the Academy in 1920-21, Secretary for Instruction from 1927 to 1930, Secretary for Instruction in Ophthalmology from 1931 to 1937, and Secretary for Home Study Courses from 1944 to 1946.

In 1939 and 1940 Dr. Gradle was chairman of the Section on Ophthalmology of the American Medical Association. He was president of the Chicago Ophthalmological Society in 1929. In 1937 he was the official delegate to the International Ophthalmological Congress in Cairo, Egypt, and president of the Pan-American Congress of Ophthalmology, 1940-46. He was a regent of the American College of Surgeons, a member of the American Ophthalmological Society, the Ophthalmological Society of the United Kingdom, Chicago Medical Society, Illinois State Medical Society, American Association for the Advancement of Science, and the Association of Military Surgeons of the United States. For several years he was chairman of the Subcommittee on Ophthalmology of the National Research Council.

He was an honorary member of the Brazilian Congress of Ophthalmology and foreign corresponding fellow of the Brazilian Congress of Ophthalmology and of the Venezuelan Academy of Medicine. In cooperation with Dr. Conrad Berens of New York and Dr. Moacyr E. Alvaro of Sao Paulo, Brazil, Dr. Gradle organized the first Pan-American Congress of Ophthalmology held in Cleveland in 1940. In 1948 he was awarded the first Pan-American medal of the United States National Society for the Prevention of Blindness. For many years he was vice-president of the Illinois Society for the Prevention of Blindness and was chairman of the committee on ophthalmology of the Illinois Public Aid Commission, Blind Assistance Program. He was consultant on trachoma among the Indians for the Department of the Interior.

Dr. Gradle was attending ophthalmologist to the Michael Reese and Cook County hospitals from 1922 to 1928, and to the Illinois Eye and Ear Infirmary, where he was chief of staff from 1933 to 1945. From 1943 to 1945 he was director of the Trachoma Clinics of Southern Illinois. In 1946 he received the Dana Medal for outstanding service in prevention of blindness. He was on the editorial staff of Ophthalmologia Ibero-Americana and was associate editor of the American Journal of Ophthalmology.

WRIGHT PLATT HEWITT

Dr. Wright Platt Hewitt was born in Royalton, Vt., in 1906. He received his medical degree from Harvard Medical School in 1932.

At the time of his death on Feb. 2, 1950, Dr. Hewitt was practicing otolaryngology in Cambridge, Mass. He was affiliated with the Cambridge and Mount Auburn hospitals.

Dr. Hewitt was a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, and a member of the New England Oto-Laryngological Society and the American Otorhinologic Society for Advancement in Plastic and Reconstructive Surgery.

Dr. Hewitt is survived by his wife.

REUBEN PAUL HIGGINS

Dr. Reuben Paul Higgins was born Sept. 27, 1880, in McGraw, New York. A graduate of Cornell University, Dr. Higgins received his medical degree from Johns Hopkins Medical School in 1905. His postgraduate work was done in New York City and Philadelphia.

Dr. Higgins began the practice of medicine in Cortland, New York, in 1905. He was chief of the eye, ear, nose and throat department at the Cortland County Hos-

pital and from 1935 to 1938, he was also chief of staff.

A specialist certified by the American Board of Ophthalmology, Dr. Higgins was a Fellow of the American Academy of Ophthalmology and Otolaryngology, a diplomate of the American College of Surgeons, and a member of the Cortland County Medical Society and the Central New York Eye, Ear, Nose and Throat Society.

Dr. Higgins died Jan. 13, 1949, in Cortland. He is survived by his wife, one daughter, and two sons.

EMERSON STANLEY HILL

Dr. Emerson Stanley Hill, who was born in Maxville, Ontario, in 1898, died in Torrington, Conn., Oct. 26, 1949.

Dr. Hill received his medical degree from McGill University in 1923. He began the practice of medicine in River Bend, Quebec, in 1924. He did postgraduate work at the Manhattan Eye, Ear and Throat Hospital in New York City from 1931 to 1935, when he started practice in Torrington.

A specialist certified by the American Board of Otolaryngology, Dr. Hill was chief of the otolaryngology, ophthalmology and rhinology service at the Charlotte Hungerford Hospital in Torrington. Dr. Hill was also ophthalmologic consultant to the Litchfield County Hospital in Winsted, Conn.

Dr. Hill was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American Medical Association, and the American College of Surgeons, past president of the Torrington Medical Society and a member of the Litchfield County Medical Association and the Connecticut State Medical Society.

Dr. Hill is survived by his wife, Rhoda Simpson Hill, and two daughters.

JOSEPH WILLIAM HOWARD

Dr. Joseph William Howard, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, died Nov. 19, 1949, at the age of 80.

Dr. Howard received his medical degree from the Medical College of Kansas City in 1903. Before his retirement he was affiliated with St. Mary's and St. Luke's hospitals in Kansas City, Mo.

WILLIAM HENRY HOWARD

Dr. William Henry Howard, who was born in 1893, died in Knoxville, Iowa, on Feb. 11, 1950.

Dr. Howard received his medical degree from the Hahnemann Medical College and Hospital in Chicago in 1915. He practiced medicine in Minneapolis, Minn.

Dr. Howard was a Fellow of the American Academy of Ophthalmology and Otolaryngology. He served as a captain in the Army Medical Corps during World War II.

WESTLEY MARSHALL HUNT

Dr. Westley Marshall Hunt was born in Auburn, Maine, in 1888. He received his medical degree from Dartmouth Medical School in 1913. After doing postgraduate work in Vienna, Dr. Hunt became an instructor at New York University and Bellevue Medical College in 1920. He was named lecturer in otolaryngology in 1922, and from 1925 to 1930 served as professor of otology at the college. From 1924 until 1935 he was director of the department of otolaryngology at Fifth Avenue Hospital.

At the time of his death Dr. Hunt was director of surgery at Manhattan Eye, Ear and Throat Hospital, attending otolaryngologist and bronchoscopist at St. Luke's Hospital, bronchoscopist at the Hospital of Special Surgery; and he was consulting rhinologist and otolaryngologist to Staten Island and Huntington hospitals and consulting otolaryngologist to Women's Hospital and the National Hospital for Speech Disorders.

Dr. Hunt was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Surgeons, and the American Medical Association, a Diplomate of the American Board of Otolaryngology, past president of the New York League for the Hard of Hearing, and past chairman of the Section on Otolaryngology of the New York Academy of Medicine. He was also a member of the American Laryngological, Rhinological and Otological Association, the American Broncho-Esophagological Association, the American Laryngological Association, the American Otological Society, and various state and local societies. Dr. Hunt served in France as the commander of a surgery operating team during World War I.

Dr. Hunt died June 28, 1950. He is survived by his wife.

REUBEN KAYSER

Dr. Reuben Kayser was born in New York City in 1898. He received his medical degree from Cornell University Medical College in 1922.

Dr. Kayser was affiliated with the Samaritan, Israel Zion, Brooklyn Eye and Ear hospitals in Brooklyn and the Manhattan Eye, Ear and Throat Hospital in New York.

A specialist certified by the American Board of Otolaryngology, Dr. Kayser was a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American College of Surgeons, a member of the American Medical Association and the American Otorhinologic Society for Advancement in Plastic and Reconstructive Surgery.

Dr. Kayser died in West Palm Beach, Fla., April 13, 1950, at the age of 52.

CHARLES FAWCETT KUTSCHER

Dr. Charles Fawcett Kutscher, who was born in 1900, died this year. He received his medical degree from the University of Pittsburgh School of Medicine in 1927.

Dr. Kutscher was on the staff of the Elizabeth Steel Magee Hospital and Eye and Ear Hospital, and the West Pennsylvania Hospital. He was assistant professor of ophthalmology at the University of Pittsburgh School of Medicine.

Dr. Kutscher was a Fellow of the American Academy of Ophthalmology and Otolaryngology, a diplomate of the American Board of Ophthalmology, and a member of the American Medical Association.

CHARLES ALFONZO LEAVY

Dr. Charles Alfonzo Leavy was born Sept. 25, 1872, in Palmyra, Mo. He died Feb. 11, 1950, in St. Louis.

Dr. Leavy received his medical degree from the Marion-Sims-Beaumont Medical College in St. Louis. He did postgraduate work under Prof. Docent Alexander at the Royal University of Vienna from 1905 to 1906, and in London from 1912 to 1913.

Dr. Leavy started the practice of medicine in St. Louis in 1903. He was clinical instructor of otolaryngology at the Marion-Sims-Beaumont Medical College from 1903 to 1905, and he was an honorary staff member of the Missouri Baptist Hospital.

A Life Fellow in the American Academy of Ophthalmology and Otolaryngology, Dr. Leavy was a member of the American Medical Association, the Southern Medical Association, the Missouri State Medical Society, and the St. Louis Medical Society. He served as a captain in the Army Medical Corps during World War I.

Surviving Dr. Leavy are his wife, Estelle Leschen Leavy, two sisters and two brothers.

EDWARD LAUREL LINGEMAN

Dr. Edward Laurel Lingeman was born Feb. 28, 1887, in Brownsburg, Ind. He received his medical degree from the Indiana University School of Medicine in 1912 and did postgraduate work at the Manhattan Eye, Ear and Throat Hospital.

Dr. Lingeman began the practice of medicine in Brownsburg, Ind., in 1914. He was professor of otolaryngology at Indiana University School of Medicine, and he was on the staffs of Methodist, St. Vincent's, General, St. Francis, and Indiana University hospitals.

Dr. Lingeman was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American Laryngological, Rhinological and Otolaryngological Society, and the American Medical Association, a diplomate of the American Board of Otolaryngology, and a member of state and local medical societies.

Dr. Lingeman died Jan. 5, 1950, in Indianapolis. He is survived by his wife, Mabel E. Lingeman, two sons, and a daughter.

JOHN MARION LORE

Dr. John Marion Lore was born in Corleone, Italy, in 1892. He received his medical degree from the Bellevue Hospital Medical College in 1915.

Dr. Lore served as clinical professor of otorhinolaryngology at his alma mater, now known as the New York University College of Medicine, of which he was alumni director. He was clinical professor of otorhinolaryngology at the New York Post-Graduate Medical School and Hospital, and he was affiliated with the New York Foundling, Manhattan Eye and Ear, Columbus and French hospitals. He was also director of the division of otolaryngology at St. Vincent's Hospital.

A specialist certified by the American Board of Otolaryngology, Dr. Lore was a Fellow of the American Academy of

Ophthalmology and Otolaryngology, the American College of Surgeons, the American Laryngological, Rhinological and Otological Society, and the American Medical Association, and a member of the New York Academy of Medicine. He was a member and past president of the Italian Medical Association in New York and, in 1938, was made a Knight of the Kingdom of Italy.

Dr. Lore died Jan. 21, 1950, at the age of 57.

JUSTUS ABNER MATTHEWS

Dr. Justus Abner Matthews was born Sept. 27, 1877, in Foster, Minn. He received his medical degree from the University of Minnesota Medical School in 1905.

Dr. Matthews began the practice of medicine in 1906 at the Mayo Clinic, Rochester, Minn., where he was chief of staff of the section on laryngology and rhinology. In 1915 he was appointed associate professor of rhinology and laryngology at the Mayo Foundation, resigning the post in 1917. He then moved to Minneapolis where he was on the staffs of Eitel and Northwestern hospitals.

A Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Surgeons, the American Laryngological, Rhinological and Otological Society, and the American Medical Association, Dr. Matthews was also a member of the Minnesota State Medical Society and the Hennepin County Medical Society. He was a veteran of the Spanish-American War.

Dr. Matthews died May 21, 1950, in Rochester, Minn. He is survived by his sister, Harriet Matthews.

ALBERT GEORGE McAULEY

Dr. Albert George McAuley was born May 25, 1873, in Ventnor, Ont. He received his medical degree from McGill University, Montreal, in 1900.

In 1904 Dr. McAuley began the practice of medicine in Montreal where he was on the house staff of the Royal Victoria Hospital. He remained there until 1914 when he joined the house staff of the Massachusetts Eye and Ear Infirmary. Upon his return to Montreal he was appointed to the department of ophthalmology at the Royal Victoria Hospital, first as a clinical assistant, then as consultant in ophthalmology. Dr. McAuley also served as head of the department of ophthalmology at St. Mary's Hospital, consulting ophthalmologist at the Alexandra Hospital and lecturer in ophthalmology at McGill University.

Dr. McAuley was certified by the American Board of Ophthalmology, a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American College of Surgeons, a member of the Canadian Medical Association, the Montreal Medico-Chirurgical Society, and a charter member of the Canadian Ophthalmological Society and the Montreal Ophthalmological Society.

Dr. McAuley died Dec. 28, 1949, in Montreal. He is survived by his sister, Mrs. A. Cook.

CLYDE ELLIOTT McDANNALD

Dr. Clyde Elliott McDannald was born in Warm Springs, Va., March 27, 1876. He died Aug. 13, 1949, at his home in New York City.

Dr. McDannald received his medical degree from the University College of Medicine, Richmond, Va., in 1898. After completing an internship in Virginia Hospital in Richmond, he went to New York City to continue his studies at the New York Post-Graduate Medical School and Hospital. He entered the field of ophthalmology by way of an internship in the New York Eye and Ear Infirmary in 1905. He was appointed surgeon in 1921. Dr. McDannald was with the Infirmary for forty-four years. During this time he also served on the attending staffs of the New York Hospital, the Lying-In Hospital, and the New York Polyclinic Medical School and Hospital.

A specialist certified by the American Board of Ophthalmology, Dr. McDannald was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Surgeons, and the American Medical Association, a member of the New York Academy of Medicine, the American Ophthalmological Society and the New York Ophthalmological Society.

Surviving Dr. McDannald are his wife, Evelyn Tunison McDannald, a daughter, Ann Pettus Wyman, and a son, Clyde.

NATHAN DAVIS McDOWELL

Dr. Nathan Davis McDowell was born Aug. 11, 1872, in Trenton, Tenn. He received his medical degree from the Belle-

vue Hospital Medical College in 1897. He was otolaryngologist and chief of staff at the Rochester General Hospital, consultant otolaryngologist at Iola Sanitarium, otologist for the Rochester School for the Deaf, and on the staffs of Rochester General and Park Avenue hospitals.

A diplomate of the American Board of Otolaryngology, Dr. McDowell was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Surgeons, and the American Medical Association, a member of the Pathology Society and the Monroe County Medical Association, and past-president of the Rochester Academy of Medicine.

Dr. McDowell died Dec. 25, 1949, at the age of 77.

ROY CARLYLE McLAUGHLIN

Dr. Roy Carlyle McLaughlin was born in Ontario, Can., in 1891. He received his medical degree from the Manitoba Medical College in 1917.

After completing postgraduate work in Vienna, Budapest, London and Edinburgh, Dr. McLaughlin began the practice of medicine in Saskatchewan Province. After three years, he moved to Evanston, Ill., where he spent the next five years. From there he went to Los Angeles, Calif., where he was on the staff of the White Memorial Hospital. He was also on the staff of the Hollywood Presbyterian Hospital, Hollywood.

A Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, Dr. McLaughlin was a diplomate of the American Board of Otolaryngology, a member of the Los Angeles County Medical Association and the Los Angeles Society of Ophthalmology and Otolaryngology.

Dr. McLaughlin died Oct. 12, 1949, in Hollywood. He is survived by his wife.

STERLING FREDERIC MENGEL

Dr. Sterling Frederic Mengel was born Dec. 19, 1901, in Reading, Pa. He received his medical degree from the Jefferson Medical College of Philadelphia in 1926. His postgraduate work was done at the George Washington University School of Medicine, New York University Post-Graduate Medical School, Columbia University College of Physicians and Surgeons, and Gill Memorial Eye, Ear and Throat Hospital.

Dr. Mengel began the practice of medicine in Schuylkill Haven, Pa., in 1926. He was assistant surgeon at the clinic of Wills Eye Hospital in Philadelphia, and ophthalmologist at the Good Samaritan Hospital, Pottsville, Pa.

Dr. Mengel was a diplomate of the American Board of Ophthalmology, a Fellow of the American Academy of Ophthalmology and Otolaryngology, a member of the American Medical Association, the Medical Association of the State of Pennsylvania, the Schuylkill County Medical Society, the Association for Research in Ophthalmology, the Pan-American Association of Ophthalmology, and the Lower Anthracite Eye, Ear, Nose and Throat Association. He was a commander in the Navy during World War II.

Dr. Mengel died June 2, 1950, in Schuylkill Haven, Pa. He is survived by his parents, Mr. and Mrs. Fred C. Mengel.

WILLIS O. NANCE

Dr. Willis O. Nance was born in 1871 and received his medical degree from the Bellevue Hospital Medical College in 1893. He was certified by the American Board of Otolaryngology. Until his retirement in 1932 he was engaged in the practice of medicine in Chicago. Dr. Nance was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology.

We have belatedly been informed of his death about two years ago.

EZRA EUGENE NEFF

Dr. Ezra Eugene Neff was born April 9, 1890. He received his medical degree from the University of Virginia Department of Medicine in 1916 and did postgraduate work at the New York Eye and Ear Infirmary, and in Vienna and London.

Dr. Neff served as a captain in the Medical Corps during World War I. In 1922 he began the practice of medicine in Madison. He was professor of ophthalmology at the University of Wisconsin Medical School; co-chief of staff of the Wisconsin State General Hospital, department of ophthalmology; consulting ophthalmologist, Madison General Hospital.

A Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, Dr.

Neff was a member of the American Ophthalmological Society.

Dr. Neff died Oct. 31, 1949, at his home in Madison. He is survived by a daughter, Ruth Rhea Neff, and a son, Walter.

THOMAS PHILLIP O'CONNOR

Dr. Thomas Phillip O'Connor was born Aug. 7, 1891. After obtaining his medical degree from the Creighton University School of Medicine, he did postgraduate work in New York City.

Dr. O'Connor began the practice of medicine in Chicago in 1918. He was chairman of the department of otolaryngology, Wesley Memorial Hospital, and associate professor of otolaryngology at Northwestern University Medical School.

Dr. O'Connor was a diplomate of the American Board of Otolaryngology, a Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the Chicago Medical Society.

Dr. O'Connor died March 25, 1948. Surviving are his wife, Anna H. O'Connor, and a sister.

JAMES TIMOTHY O'HORA

Dr. James Timothy O'Hora was born Jan. 4, 1895, in Mazomanie, Wis. He received his medical degree from Rush Medical College in Chicago. His postgraduate work was done at St. Joseph's Hospital and Henry Ford Hospital in Detroit.

Dr. O'Hora began the practice of medicine in Detroit in 1930. He was chief of staff of the ear, nose and throat department of Women's Hospital, associate in the department of ophthalmology and otolaryngology at Children's Hospital, and on the visiting staff of Henry Ford Hospital.

Dr. O'Hora, a diplomate of the American Board of Otolaryngology, was a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, and a member of the Detroit Ophthalmological Society, the Detroit Oto-Laryngological Society, and state and county medical societies.

A friend writes of Dr. O'Hora: "He possessed the somewhat rare quality usually associated with the old family doctor. He had a warm, friendly personality and was interested in his patients as people as well as in their clinical histories. Because of his friendliness and his enjoyment of interesting conversation, he was always a welcome addition to any small gathering."

Dr. O'Hora died Nov. 9, 1949, in Detroit. He is survived by his wife, Regina T. O'Hora, and a son, Dennis.

JOSEPH GREELEY PARSONS

Dr. Joseph Greeley Parsons, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, was born Jan. 27, 1871, in Rutland County, Vt. He received his medical degree from the University of Minnesota Medical School in 1898.

Dr. Parsons began the practice of medicine in Lake Preston, S. D., in 1898. He was on the faculty of the University of South Dakota School of Medical Sciences from 1900 to 1908. The years between 1908 and 1924 were spent in Sioux Falls, and those between 1924 and 1930 in Lewiston, Mont. He joined the Crookston (Minn.) Clinic staff as ophthalmologist and otolaryngologist in 1930, retiring in 1950. He was a staff member of St. Vincent's and Bethesda hospitals in Crookston.

Dr. Parsons was a member of the American Medical Association, the Minnesota State Medical Association, the Minnesota Academy of Science, the Montana Academy of Ophthalmology and Otolaryngology, and the Royal Society of Arts of London. He helped to organize and was a member of the Sioux Valley Academy of Ophthalmology and Otolaryngology.

Dr. Parsons died May 14, 1950, in Hampton Falls, N. H. He is survived by his wife, Margaret Cobur Parsons, a daughter, Elizabeth Turner, and a son, Seth.

HARVEY OLLIS RANDEL

Dr. Harvey Ollis Randel, a Fellow of the American Academy of Ophthalmology and Otolaryngology, died Feb. 17, 1950, at the age of 54.

Dr. Randel received his medical degree from the Chicago College of Medicine and Surgery in 1915. He did postgraduate work in ophthalmology at the University of Pennsylvania School of Medicine. Dr. Randel practiced in Oklahoma City, Okla., where he was on the staffs of St. Anthony's, Mercy and Wesley hospitals. He was also associate professor of ophthalmology at the University of Oklahoma

School of Medicine.

Dr. Randel was past president of the Oklahoma Society of Ophthalmology, a diplomate of the American Board of Ophthalmology, and a fellow of the American Medical Association. He was a veteran of World War I.

Dr. Randel is survived by his wife.

SIMON HARRY RATNER

Dr. Simon Harry Ratner was born September 11, 1890, in London, England. He received his medical degree from the University of Pittsburgh Medical School in 1912. He did postgraduate work at the Chevalier Jackson Clinic in Philadelphia and in Vienna, Prague and Berlin.

In 1914 Dr. Ratner began the practice of medicine in Pittsburgh. He was senior attending otologist at the Montefiore Hospital and consulting bronchologist and otologist at the Pittsburgh Tuberculosis Hospital.

A specialist certified by the American Board of Otolaryngology, Dr. Ratner was a Fellow of the American Academy of Ophthalmology and Otolaryngology, a member of the American Medical Association, the Pennsylvania Medical Society, and the Pittsburgh Medical Society. He served during World War I as captain in the Canadian Medical Corps.

Dr. Ratner died Feb. 10, 1950, in Miami Beach, Fla. He is survived by his wife, Mildred Ratner, two sisters and one brother.

ROBERT ELDON REPASS

Dr. Robert Eldon Repass was born in Marion County, Ind., Sept. 14, 1882. He received his medical degree from the Indiana Medical College, School of Medicine of Purdue University, Indianapolis, in 1906. He did postgraduate work at the Harvard Medical School.

Dr. Repass began the practice of medicine in Indianapolis. In 1925 he moved to Ft. Lauderdale, Fla., and from there he went to Miami Beach. He served on the staffs of St. Francis, Victoria, and Jackson Memorial hospitals.

A specialist certified by the American Board of Otolaryngology, Dr. Repass was a Senior Fellow of the American Academy of Ophthalmology and Otolaryngology. He would have gained the status of a Life Fellow within a few months. Dr. Repass was also a member of the American Medical Association, the Florida Society of Ophthalmology and Otolaryngology, the Florida Medical Association, and the Dade County Medical Association.

Dr. Repass died Oct. 27, 1949, in Coral Gables, Fla. He is survived by his wife and a son.

JOHN HENRY RINDLAUB

Dr. John Henry Rindlaub was born May 1, 1865, in Lancaster, Wis. He was graduated from the state teachers college there in 1886. During the next four years he was a principal of high schools but spent his summers at the University of Wisconsin Medical School preparing for the practice of medicine. He then entered the Bellevue Hospital Medical College of New York but was there only a short time when he went to Washington and for four years wrote case histories in the War Department. While there he entered the George Washington University School of Medicine.

During the next six years Dr. Rindlaub spent the summers at Harvard Medical School, the New York Post-Graduate Medical School and Hospital, and Freedman Hospital in Washington. He received his medical degree from the Howard University College of Medicine. The next two years were spent abroad studying in Berlin, Dublin, London and Vienna. For a year he was assistant to Professor Chiari, nose and throat specialist, at Vienna University.

In 1896 Dr. Rindlaub began the practice of medicine in Fargo, N. D. A sister, Dr. Elizabeth Rindlaub, joined him after her graduation, and later a brother, Dr. Martin Rindlaub, joined him in practice. For many years he was chief of the section of ophthalmology and otolaryngology at the Fargo clinic. He was also affiliated with the St. John's Hospital and the former Norgard Hospital. In 1928 he went to Pasadena, Calif., to practice. He was on the staff of Huntington Memorial, the Physicians and Surgeons, and the Los Angeles Eye, Ear, Nose and Throat hospitals. He returned to Fargo in 1933 because of ill health.

Dr. Rindlaub was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology and the American College of Surgeons. He was instrumental in organizing the North Dakota Academy of Ophthalmology and Otolaryngology, and was one of its first presidents. He was a member of the Minnesota Academy of

Ophthalmology and Otolaryngology, the National Association for the Prevention of Blindness, and the American Medical Association.

Dr. Rindlaub died March 12, 1950, at the age of 84. He is survived by two sons, Col. Bruce and Newhall D., and three sisters, Mrs. John Wooledge, Mrs. John Robertson and Dr. Elizabeth, also a Fellow in the Academy.

CHARLES ARTHUR RINGLE

Dr. Charles Arthur Ringle was born June 20, 1886, in South Bend, Ind. He died April 22, 1950, in La Junta, Colo.

Dr. Ringle received his medical degree from Northwestern University Medical School in 1892. He began the practice of medicine in La Porte, Ind., in 1893. In 1902, Dr. Ringle went to Greeley, Colo., where he was affiliated with the Weld County Public Hospital.

Dr. Ringle was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, fellow of the American College of Surgeons and the American Medical Association, diplomate of the American Board of Otolaryngology, and a member of the Colorado State Medical Society, the Colorado Society of Ophthalmology and Otolaryngology, and the Weld County Medical Association.

Dr. Ringle is survived by two sons, Harold B. and Dr. Arthur L., and two daughters, Mrs. Helen Hurlbut and Mrs. Margaret Blackmore.

CLARENCE RUBENDALL

Dr. Clarence Rubendall, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, was born August 21, 1883, in Orangeville, Ill. He received his medical degree from the University of Nebraska College of Medicine.

Dr. Rubendall was professor emeritus and chairman of the department of otorhinolaryngology at his alma mater. He was on the staffs of Immanuel and Children's hospitals. He also served on the courtesy staff of St. Joseph's Hospital. He was oculist and aurist for the Union Pacific Railroad.

A specialist certified by the American Board of Otolaryngology, Dr. Rubendall was a fellow of the American Medical Association, and a member of the Nebraska Academy of Ophthalmology and Otolaryngology, and the Omaha and Council Bluffs Ophthalmological and Otolaryngological Society.

Dr. Rubendall was instrumental in establishing the program for screening the hearing problems in the Omaha schools. He was very highly commended for this work by the Omaha Public Schools.

Dr. Rubendall died June 6, 1950, in Omaha. He is survived by his wife, Elizabeth Shortliff Rubendall, and two daughters.

MAXWELL DONNELL RYAN

Dr. Maxwell Donnell Ryan was born in Leavenworth, Kan., July 20, 1901. He received his medical degree from McGill University Faculty of Medicine, Montreal, Can., in 1927. His postgraduate work was done at Montreal General Hospital and Bellevue Hospital in New York City.

Dr. Ryan began the practice of medicine in New York City in 1934. He was clinical professor of otolaryngology at the New York University Medical School; surgeon and bronchoscopist at the New York Eye and Ear Infirmary; consultant at St. Clare's Hospital; Pilgrim State Hospital, Brentwood, L. I.; Kings Park (L. I.) State Hospital; State Hospital, Greenwich, Conn.; Hackensack (N. J.) hospitals; and the consulting surgeon at the National Hospital for Speech Disorders.

A specialist certified by the American Board of Otolaryngology, Dr. Ryan was a Fellow of the American Academy of Ophthalmology and Otolaryngology, the American College of Chest Physicians, and the American Medical Association, and a member of the New York Otolaryngology Society.

Dr. Ryan died June 11, 1950, in New York City. He is survived by his mother, Mrs. Helen F. Ryan, Lake Wales, Fla., a sister and a brother.

ORLANDO PETER SCHOOFS

Dr. Orlando Peter Schoofs was born July 2, 1894, in Remsen, Iowa. He died June 8, 1950, in Milwaukee, Wis.

Dr. Schoofs received his medical degree from the Marquette University School of Medicine. He did postgraduate work at the Manhattan Eye, Ear and Throat Hospital.

Dr. Schoofs began the practice of medicine in Johnsburg, Wis., in 1916. He later went to Milwaukee where he was clinical professor of otolaryngology at Marquette

University School of Medicine. He was also on the staff of St. Joseph's Hospital.

A specialist certified by the American Board of Otolaryngology, Dr. Schoofs was a Fellow of the American Academy of Ophthalmology and Otolaryngology, and the American Medical Association, and a member of the Wisconsin State Medical Society, the Milwaukee Oto-Ophthalmic Society, and the Milwaukee County Medical Society. Dr. Schoofs was a Latin scholar and a student of the classics.

Surviving Dr. Schoofs are his wife, Alma H. Schoofs, and a daughter, Jane.

JOHN ARTHUR SPENGLER

Dr. John Arthur Spengler, a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, was born March 10, 1868, in Geneva, New York. He died in his native city Aug. 12, 1949.

Dr. Spengler received his medical degree from the University of Buffalo School of Medicine in 1899. He began the practice of medicine the same year in Geneva. He was ophthalmologist at the Geneva General Hospital, eye surgeon for the New York Central Railroad and ophthalmologist for the Lehigh Valley Railroad.

A diplomate of the American Board of Otolaryngology, Dr. Spengler was a Fellow of the American College of Surgeons, and a member of the American Medical Association, the American Association for the Advancement of Science, the Association for Research in Ophthalmology, the New York State Medical Society, the Ontario County Medical Society, the Buffalo Ophthalmic Club, the American Chemical Society, and the Optical Society of America.

For many years Dr. Spengler was interested in fundus photography of the eye and he possessed and used two of the earliest Zeiss Nordensen cameras in America. He gave many lectures on this work.

Surviving Dr. Spengler are his wife, Edra MacVicar Spengler, and two daughters.

FREDERICK G. STUEBER

Dr. Frederick G. Stueber was born in Baden, Germany, in 1860. When he was very young he came to America with his parents. After receiving his medical degree from Rush Medical College in 1882, he started the practice of medicine in Petersburg, Ill. He later attended the Illinois Eye and Ear Infirmary. Following this, he spent a number of years doing postgraduate work in Berlin, Heidelberg and London.

Of the sixty years he spent in the practice of medicine, the majority of them were spent in Lima, Ohio. He was a charter member of the board of trustees of the old Lima City Hospital and Memorial Hospital.

A Life Fellow of the American Academy of Ophthalmology and Otolaryngology, Dr. Stueber was a member of the American Medical Association, the Allen County Academy of Medicine and the American Laryngological, Rhinological and Otological Society.

Dr. Stueber died Dec. 25, 1949. Surviving him are a daughter, Mrs. W. R. Daniels, and a son, Dr. Paul J. Stueber, also a member of the Academy.

GIDEON McDONALD VAN POOLE

Dr. Gideon M. Van Poole was born in Salisbury, N. C., Sept. 2, 1876. He received his medical degrees from the University of Maryland School of Medicine in 1899 and from the Army Medical School in 1904. His postgraduate work was done in Vienna, London, Oxford and Prague.

Dr. Van Poole entered the medical corps of the U. S. Army in 1900 and retired with the rank of a colonel in 1920. In 1921 he went into private practice in Honolulu, T. H. He was on the staffs of Queen's, St. Francis, Kapiolani, Leahi, and Children's hospitals in Honolulu.

A specialist certified by the American Boards of Ophthalmology and of Otolaryngology, Dr. Van Poole was a Senior Fellow in the American Academy of Ophthalmology and Otolaryngology. He was a member and past president of the Hawaii Territorial Medical Society and the Honolulu County Medical Society. He was also a member of the American Medical Association of Vienna, the American Medical Association, the American Laryngological, Rhinological and Otological Society, the American Bronchoscopic Society, the American Ophthalmological Society, the Association for Research in Ophthalmology, and the International College of Surgeons.

Dr. Van Poole saw service in the Orient, Mexico, and in France. He served in China during the Boxer uprising, and took part in the Philippine insurrection

and the Mexican border trouble. In World War I he received a decoration from the French government. He first went to Hawaii in 1913 for three years of duty as surgeon at Schofield Barracks and was later attending surgeon at department headquarters. In 1917 he organized, trained and equipped Evacuation Hospital No. 6 at Ft. Oglethorpe, Ga. He took the organization to France.

Dr. Van Poole died April 12, 1950, in Honolulu. He survived by his wife, Margaret Van Poole.

ORVILLE JACKSON WALKER

Dr. Orville Jackson Walker was born in Binkleman, Neb., June 28, 1888. He received his medical degree from the University of Pittsburgh School of Medicine and did postgraduate work at the New York Eye and Ear Infirmary.

Dr. Walker began the practice of medicine in Oklahoma City, Okla., in 1916. He began specializing in 1922. He was head pathologist at St. Anthony's Hospital in Oklahoma City, and he later held the same position in the Associated Hospitals in Youngstown, Ohio.

Dr. Walker was a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American College of Surgeons, a diplomate of the American Board of Otolaryngology, and a member of the Ohio State Medical Association, the Association for Research in Ophthalmology, the National Honorary Medical Fraternity, and the Mahoning County Medical Society.

During World War I Dr. Walker served as a first lieutenant in the Army Medical Corps and during World War II he served with the Office of Civilian Defense in the Youngstown district.

Dr. Walker died in Youngstown, April 27, 1950. He is survived by his wife, Mary Getty Walker, and two sons, William and Orville, Jr.

DAVID WASHBURN WELLS

Dr. David Washburn Wells, who was born in West Newton, Mass., in 1862, died March 4, 1950. He received his medical degree from the Boston University School of Medicine in 1897.

For many years Dr. Wells was affiliated with the Massachusetts Memorial Hospital in Boston and the Newton Hospital. He was professor emeritus of ophthalmology at his alma mater.

Dr. Wells was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, and a member of the American Medical Association and the New England Ophthalmological Society. He was a fellow of the American College of Surgeons and a diplomate of the American Board of Ophthalmology. Dr. Wells was the author of "Psychology Applied to Medicine" and "Stereoscopic Ophthalmology."

HORACE JAMES WILLIAMS

Dr. Horace James Williams was born in Chincoteague, Va., July 2, 1885. He received his medical degree from the Jefferson Medical College of Philadelphia in 1912. He did postgraduate work at Germantown Hospital, Jefferson Hospital, and the Pennsylvania Hospital for Nervous and Mental Diseases.

Dr. Williams' practice of medicine in Philadelphia was interrupted by the First World War in which he served in the medical corps as first lieutenant. Upon his return from the service, he specialized in otolaryngology and became recognized as an authority on diseases of the ear and their relationship to communicable diseases. He was elected professor of otology at Jefferson Medical College and later became director of the department of otology. At the time of his death he was also director of the otolaryngological departments of Germantown Hospital, Memorial Hospital, Philadelphia Hospital for Contagious Diseases, and Jeanes Hospital.

Dr. Williams was a Life Fellow of the American Academy of Ophthalmology and Otolaryngology, a fellow of the American College of Surgeons, the American Laryngological, Rhinological and Otological Society, the American Otological Society and the American Medical Association. He was a diplomate of the American Board of Otolaryngology, and a member of the state and local medical societies.

Dr. Williams died June 3, 1950. He is survived by his wife, Mrs. Hattie Bond Williams.

NORMAN LEE WOODRY

Dr. Norman Lee Woodry was born in Imlay City, Mich., Jan. 9, 1890. He received his medical degree from the Detroit College of Medicine in 1913. He did

his postgraduate work under the supervision of Dr. James E. McClintock.

Dr. Woodry began the practice of medicine in Detroit in 1918. He was affiliated with Harper, Mount Carmel Mercy, Florence Crittenton, and Holy Cross hospitals.

Dr. Woodry was a specialist certified by the American Board of Otolaryngology, a Fellow of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, and a member of the Michigan State Medical Society, the Wayne County Medical Society, the Detroit Otolaryngological Society, and the Detroit Ophthalmological Society.

Dr. Woodry died Aug. 5, 1949. He is survived by his wife, Dora Foss, and a son, Norman Lee, Jr.

INTRODUCTORY STATEMENT

All ophthalmologists are interested in the comparison of results of visual testing by battery instrumentation and clinical ophthalmologic examinations; therefore, Dr. Imus' statistical breakdown is of great importance. We have presented only the summary and conclusions drawn from his investigation, but the details and charts of his work are available either from him directly or from the Joint Committee.

In answer to a request for correlation of vision and accident experience, Dr. Kephart and Dr. Tiffin have compiled the material here presented as a reprint from the National Safety News. *The Joint Committee felt that these data should be called to the attention of ophthalmologists.*

The Joint Committee has had the privilege and pleasure of working closely with the Civil Aeronautics Administration with reference to visual problems that confront the pilot. Of these one of the most important, of course, is the question of cockpit visibility. The military, the CAA and other government groups need ophthalmologists that are informed on the semitheoretic angles of such practical research problems as the arrangement of dials on a panel, on cockpit visibility, and other seemingly important elements of flying. It is a great privilege and pleasure to present this important contribution to our understanding of this problem. More and more we shall be called on to help with such problems, and a careful study of this paper should help us appreciate their complexity.

HEDWIG S. KUHN, M. D.
Secretary, Joint Committee
Industrial Ophthalmology

COMPARISON OF ORTHO-RATER WITH CLINICAL OPHTHALMIC EXAMINATIONS

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THIS investigation was undertaken in order to ascertain the degree of dependability of the Ortho-Rater and of clinical ophthalmic examinations, and to determine the degree of relationship between them. It was also desirable to determine the degree of confidence with which one could predict the scores on the clinical ophthalmic examination from the corresponding tests with the Ortho-Rater. In addition, the question was raised as to whether different methods of administration or scoring of the Howard-Dolman test would improve the reliability of this test or alter its relationship to the test of depth perception of the Ortho-Rater.

SUMMARY AND CONCLUSIONS

1. In order to compare the results of testing vision with the Ortho-Rater and clinical ophthalmic methods, a test-retest experiment was conducted with 100 subjects obtained from the officer, cadet, and enlisted personnel of the Naval Air Training Bases, Pensacola, Florida.

2. The same examiner tested each subject with the standard clinical devices and with the Ortho-Rater, one-half of them being tested first clinically, and the other half being tested first on the Ortho-Rater. Standard procedures were used throughout, and the retest was conducted without either the examiner or the subjects having knowledge of the results of the first test.

3. In general, the visual tests incorporated in the Ortho-Rater are as reliable (as consistent in the measures obtained) as the clinical tests. In the measurement of heterophoria for distant vision and in measuring depth perception, the Ortho-Rater is more reliable. For

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Opinions or conclusions contained in this report are those of the author. They are not to be construed as necessarily reflecting the views or the endorsement of the Navy Department or the Naval Services at large.

vertical phoria at near vision, the Ortho-Rater and clinical measures have equal reliability, while for the far visual acuity and for near lateral phoria, the clinical measures are something more reliable.

4. The measures of far visual acuity obtained with the Ortho-Rater agree satisfactorily with the measures of far visual acuity obtained clinically.

5. The measures of far and near lateral phoria obtained with the Ortho-Rater do not agree closely with the measures obtained clinically. However, in view of the variability of lateral phoria as a visual function, the relationship may be as close as can be expected for any two measures of lateral phoria.

6. No statement can be made concerning the prediction of clinical vertical phoria by the Ortho-Rater because the population studied did not present a normal distribution of this function. (None of the subjects used in this investigation showed a vertical phoria of more than 1.00 prism diopter.)

7. The correlation between the Howard-Dolman test and the test of depth perception of the Ortho-Rater is too low to be considered satisfactory. This may be due in part to the lower reliability of the Howard-Dolman test. The reliability of the latter can be improved slightly by requiring that the movable rod be adjusted from in front of the fixed rod rather than from behind. However, this lowers the correlation between the Howard-Dolman test and the Ortho-Rater test of depth perception.

8. Comparison of the reliabilities of measurement on the Ortho-Rater by a single, well-trained examiner and by a number of newly trained examiners indicates the need for careful training and supervision of examiners using this instrument.

ACKNOWLEDGMENTS

This research project was conducted with the cooperation and guidance of Commander B. J. Wolpaw, (MC) USNR, instructor in ophthalmology and head of the eye clinic. The cooperation of the staff and clinical patients in returning for the retest examinations made this study possible.

Grateful acknowledgment is made to Chief Yeoman Anne Frances Black, USNR, for preparing the tables and typing the manuscript for the final draft of the report.

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VISION AND ACCIDENT EXPERIENCE

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ONE of the major problems in present day industry is the problem of safety. Industrial concerns and public agencies are very much interested in this problem and a great deal of time, effort, and money are spent in the search for factors which may be related to industrial accidents. Such factors as emotional stability, mental alertness, age, and disturbances of perception and muscle coordination have been found to be related to the frequency of industrial accidents. A further factor which has repeatedly been shown to be associated with frequency of industrial accidents is vision. Stump,[1] Wirt and Leedke,[2] Tiffin,[3] and others have pointed out this relationship. The present study attempts to show on a larger scale the relationship between industrial accidents and the visual skills of the workers employed on industrial jobs.

Vision is not a unitary factor but is composed of a number of separate skills, all of which combine to produce the degree of efficiency with which any individual performs the seeing task. The ability to read letters on a wall chart 20 feet away is no longer considered an adequate measure of an individual's ability to see. Neither is it considered that an individual who can read letters at 20 feet can perform just as efficiently

From Occupational Research Center, Purdue University.
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on a task requiring other types of seeing skills. The act of seeing results from the interplay of a number of visual skills.

In the present study, the workers on a number of industrial jobs were tested with a battery of visual skills tests included in the Bausch & Lomb Ortho-Rater. This instrument embodies tests of twelve different visual skills.

One part of the operations of the Occupational Research Center at Purdue University is concerned with the derivation and validation of visual skill patterns required by various industrial jobs. In this connection, the Occupational Research Center operates in conjunction with the Bausch & Lomb Industrial Vision Service. As a part of this service, subscribing companies send to the Occupational Research Center Ortho-Rater vision test scores for their workers together with available criteria of job success, including accident experience records. From these data, the functional relationship between vision test scores and job success is determined and the results used in establishing sets of visual requirements for different types of jobs.

It has been found that such patterns of visual skills required by industrial jobs vary from one group of jobs to another. Although there are many jobs in industry the visual demands of which are highly similar, so that one pattern of visual skills will be adequate for all the jobs in the group, there are other jobs in which the visual demands are quite different and for which a different type of visual pattern is required. Through extensive research comparing visual skill test scores with measures of success on the job, patterns of visual skills for groups of jobs have been developed. These previously developed patterns can then be applied to new groups of data supplied by industrial concerns to determine the relationships between the visual test battery scores and the criterion.

In the present study, data on 828 workers have been assembled. For each of these workers the number of industrial accidents over a period of six to eight months preceding the testing has been recorded. The workers involved were employed on various industrial jobs and in various specific industrial concerns. In all, twelve groups of jobs were involved. The type of job and the number of workers involved are shown in table I.

For each of the twelve groups of jobs in table I the appropriate visual skill pattern was identified. The workers were then divided into those whose visual skills met the requirements of this pattern and those whose visual skills did not meet these requirements. From an observation of the accident data submitted by the company, the workers in each job group were then divided into those who showed a low frequency of accidents (two or less) and those who showed a high frequency of accidents (three or more). For those workers whose visual skills met the requirements of the pattern, the percentage of those who showed a low frequency of accidents was computed. Similarly, for those workers whose visual skills did not meet the requirements of the pattern, the percentage of those who showed a low frequency of accidents was computed. These results are also shown in table I. For example, among the 59 passenger car drivers in job group 1 in table I, 35 had visual skills which met the recommended requirements. Of these 35, 25 or 71 per cent showed a low frequency of accidents. On the other hand, among those passenger car drivers whose visual skills did not meet the requirements of the standard, only 42 per cent showed a low frequency of industrial accidents. A

TABLE I

RELATIONSHIP BETWEEN VISUAL SKILL TEST SCORE PATTERNS AND FREQUENCY OF INDUSTRIAL ACCIDENTS

Job Classification	Total Number of Cases	Visual skills adequate for the job			Visual skills not adequate for the job		
		Low accident frequency	High accident frequency	% in low accident frequency group	Low accident frequency	High accident frequency	% in low accident frequency group
Passenger car drivers	59	25	10	71	10	14	42
Mobile equipment operators	116	29	10	74	55	22	71
Machine Operators (Plant A)	65	22	11	67	16	16	50
Machine Operators (Plant B)	15	4	2	67	4	5	44
Sheet Metal Workers	29	7	5	58	7	10	41
Maintenance Men	105	26	6	81	55	18	75
City bus drivers	63	21	27	44	5	10	33
Intercity Bus Drivers	66	30	26	54	3	7	30
Supervisors and Clerical	68	26	14	65	16	12	57
Machine Operators (Plant C)	125	42	33	56	16	34	32
Laborers	102	64	14	82	19	5	89
Skilled Tradesmen	15	4	5	45	2	4	33
TOTAL	828	300	163	65	208	157	57

higher percentage of those workers whose vision was adequate for the job were in the low accident frequency group. Similar figures for each of the other eleven job groups are shown in table I. In all cases, with one exception (laborers, job group 11), a higher proportion of those workers whose visual skills met the requirements of the pattern were in the low frequency of accident group, and a lower percentage of those workers whose visual requirements did not meet the standard were in the low frequency of accident group.

Of the total group of 828 workers, 463 or 66 per cent had visual skills which met the requirements of their job standard. Of these 463 workers possessing adequate visual skill, 65 per cent were in the low accident frequency group. Three hundred sixty-five or 44 per cent of the workers did not have the visual skills required by the job pattern. Of these 365 only 57 per cent were in the

low accident frequency group. This is a difference of 8 per cent in favor of that group whose visual skills met the requirements of the standard. The t-ratio for this difference in percentages is 2.22. This t-ratio indicates that the results here obtained could not reasonably have occurred through the operation of chance factors alone.

It should be borne in mind that the job patterns used in this study were derived from an analysis of test scores and job efficiency criteria. These test scores and these criteria were on completely different workers than those employed in the present study. In the derivation of the patterns, many types of industrial criteria other than accident data were used. Since there is no connection between the data used to derive the standards and the data reported in the present study, the data in table I are free from the possible bias of using the same subjects both to standardize the test and to reveal the relationship between the test and the criteria.

The data in table I indicate strongly that vision is one of the factors related to industrial accidents. Many other factors are involved and the relationship shown in the present study is not sufficiently high to account for all industrial accidents. However, a definite relationship is shown, indicating that among workers whose visual skills are adequate for the task they are performing there is a higher percentage of workers whose frequency of accidents is low.

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AREAS OF VISION AND COCKPIT VISIBILITY

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AIRCRAFT designers are frequently required to work under the handicap imposed by lack of quantitative descriptions of man pertinent to their specific problem. This is certainly true of those who are concerned with outside visibility factors in cockpit design. Insofar as we have been able to determine, there is no summary of data which is adequate to provide the designer with information on what man is capable of viewing from a seated position if no visual obstructions are present. We have considered that such description is essential, not only for indicating the extent of improvement which theoretically could be obtained by design development but also for evaluating current and proposed arrangements.

This paper is concerned with the field of vision of which man is capable in relation to the field of vision to which he is restricted when operating aircraft or machinery from his predetermined position in a work space. Since major body movements involving moving and twisting the trunk are inefficient, we have limited ourselves to consideration of areas which can be viewed from the operating position under three conditions: (1) with the eyes and head fixed, (2) with eye movement, and (3) with both head and eye movement.

A comprehensive search of the literature was undertaken to accumulate data for the summary and detailed description of both the form field and the color fields. As the search progressed it be-

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came increasingly evident that additional data would have to be developed in areas in which little information existed. Experimental work was carried out to the extent of the time and personnel available. The results are reported together with the findings obtained from the literature.

The visual field is a highly variable entity. Its size and shape are subject to constant fluctuations as a result of the variations in stimuli to which the eye is exposed. A description of the visual field is meaningful only if all the conditions under which that field was measured are specifically stated.

Within the field of vision there are optical areas for (1) the perception of motion, (2) discernment of objects impinging on the periphery, (3) discrimination between object and background and different objects, and (4) fine discrimination which is required in reading and similar activities. Motion can be perceived at the outermost peripheral limits before the moving object is actually sighted or recognized. Discrimination occurs chiefly within an area extending about 25° in all directions from the point of fixation. The binocular field is about 52° in extent and represents the area common to both eyes which is covered by successive eye movements alone. Fine discriminatory processes take place in a very small circle 1° 2″ in diameter which represents the projection of the maculae.[15]

The size of the visual field is dependent on the intensity of illumination and the color and area of the target which is presented. Age (after forty years) tends to narrow the field limits. Errors of refraction, other than presbyopia, have no significant effect on the size of the form field but may affect the size of the color fields. In every instance the form field is more stable than are the fields for color.

In spite of the amount of experimental work done on various aspects of vision, there is little information concerning the extension of the field by eye and head movements. In surveying the literature pertinent to our study, it appears that most of the measurements were made with central fixation and low levels of illumination (7 foot-candles and less). The field limits determined under these conditions cannot be regarded as maximum. It is necessary to consider seeing under conditions of photopic illumination and use of head and eye movements in order to determine the boundaries of vision which could be utilized by the pilot.

MAXIMUM LIMITS OF THE FORM FIELD

Monocular Form Field (Eye Fixed)

The work of Roenne (1915), cited by Duke-Elder,[5] presents measurements which may be taken to represent the extreme boundaries of the monocular field under optimum conditions (table I). The extension of the temporal field beyond 90° is made possible by the prominence of the cornea and the refraction of the peripheral rays at the limbus. This table apparently constitutes the source of values for specific meridians which appear in many of the texts. Roenne's table does not include either the level of illumination used or the number of subjects on which the data are based. Consequently, it is not clear whether his results represent averaged values or values on a single individual. This is true of much of the early work on vision. The Library of Congress and the Army Medical Library do not have copies of Roenne's studies; it was therefore impossible to find out whether additional data are given in the original reports.

We have made measurements on three untrained subjects at 51 foot-candles illumination, using 2° and 5° white on black stimuli (table II). The

TABLE I

ISOPTERS IN THE NORMAL FIELD (ROENNE, 1915)

Visual Angle	Object (mm)	Distance (mm)	Out	Out Down	Down	In Down	In	In Up	Up	Out Up	Reciprocal of Visual Angle
9°	160	1000	107	102	76	67	62	72	69	95	1
4.5°	80	1000	104	99	76	67	62	72	69	91	2
2.25°	40	1000	101	96	76	67	62	72	69	91	4
1.14°	20	1000	99	96	76	67	62	72	69	88	8
34.2′	10	1000	93	89	76	67	62	67	69	79	16
17.2′	5	1000	82	72	69	59	60	64	66	75	32
8.6′	5	2000	72	62	51	47	50	47	51	50	64
4.3′	2.5	2000	33	34	27	25	31	25	24	25	128
2.1′	2.5	4000	10	17	13	12	15	15	11	12	256
1.0′	1.25	4000	10	9	8	7	6	6	4	6	512

from Duke-Elder.[5]

fields were mapped in twenty-four meridians on a Ferree-Rand perimeter at a distance of 330 mm. These observations were made chiefly in order to compare fields taken at a known level of illumination with the values presented in table I. Inspection of tables I and II indicates similarity of fields measured with comparable stimuli.

Limits of Area Which Can Be Viewed with Eye Movements (Head Stationary)

We were unable to find any data on the peripheral limits of the area which can be scanned when eye movements are employed. The only report concerned with field limits was that of Chapanis,[3] who published a table presenting values for "A Typical Set of Normal Field Measurements Made with Roving Fixation" in 24 meridians. The values given, however, were intended to serve only as an illustration of Chapanis' method for calculating the field in steradians and do not represent actual measurements of the binocular field.

Some of the early work on vision done by Hering, Helmholtz, Schurman, and other contemporary investigators included maximum deviations of the eyes from the point of central fixation,* but no peripheral limits with the eyes

*The term "central fixation" refers in every instance to the anatomic mid-central or zero position of the eyes.

TABLE II

MONOCULAR FIELD LIMITS FOR 3 UNTRAINED SUBJECTS AT 51 FOOT-CANDLES ILLUMINATION WITH 2° AND 5° WHITE-ON-BLACK STIMULI

Subject	Stimulus size	Breadth of Field		
		Out	Up	Down
A	2°	98°	69°	77°
	5°	103°	71°	79°
B	2°	103°	58°	69°
	5°	107°	57°	71°
C	2°	97°	68°	77°
	5°	107°	66°	78°

in the deviated positions are reported. Further, these observations were limited to two or three subjects and very often to a single subject—usually the experimenter himself. The figures reported by the separate investigators are, however, fairly consistent (table III).[11]

Bielschowsky[2] has stated that fixation points do not usually vary more than 13° to 15° from the point of central fixation when performing every day visual tasks. This is a very slight excursion in view of the high degree of motility which the eyes possess. Low[12] reported that angular deviation from the line of vision was greatly increased through practice. The inference is that few individuals make use of their full capacity for eye movement, preferring to turn the head or body rather than the eyes.

The pilot, who must necessarily keep close watch on the instrument panel, is especially dependent on peripheral vision and rapid eye movement. It seemed warranted, therefore, to make observations of the extension of the field which could be gained by eye movements.

Six subjects were tested for maximum deviation of the right eye in the nasal, temporal, up, and down positions. The Ferree-Rand perimeter was used with illumination of 51 foot-candles and a 1° white-on-black stimulus. Maximum deviation points which the subjects could keep without undue discomfort were established. The peripheral limits with the eye in position were mapped in twelve meridians at a distance of 330 mm. The peripheral points were determined by three successive trials in which the stimulus appeared consistently at the same point. Results were recorded to the nearest degree preceding consistent disappearance of the stimulus for three successive trials (tables IVa, IVb, IVc).

Values and standard deviations for the six subjects show wide variability in some planes. Age, refractive errors and facial contour are factors contributing to variation among individuals. Although even greater variation would be expected if the sample size were increased, the larger sample would be expected to have a smaller standard deviation.

Because of the small size of the sample, these observations are to be regarded as indicative and not in any way as conclusive.

Our test results show greater maximum deviations of the eye than do those of the experimenters listed in table III.

TABLE III

MAXIMUM RANGE OF EYE MOVEMENTS WITHIN WHICH FIXATIONS CAN BE ACHIEVED REPORTED BY SIX EXPERIMENTERS

Experimenter	No. of Subjects	Maximum Deviation of Fixation Points			
		Up	In	Down	Out
Helmholtz	1	45°	50°	45°	50°
Schurman (not available)		34°	45°	57°	42°
Volkmann	3 (ave.)	35°	42°	50°	38°
Aubert	1	30°	44°	57°	38°
Kuester	1	33°	44°	43°	43°
Hering	1 lt. eye	20°	44°	62°	43°
	rt. eye	20°	46°	59°	43°
Averages		31°	45°	53°	42°

Compiled from observations reported by Hering.[11]

When limits were measured with the eye at maximum temporal deviation, the total field was found to be increased. The greatest increase, as compared to the field mapped with central fixation, occurred in the direction opposite to deviation. Increases of the field in the up and down positions were similar. Fields in the direction of deviation are slightly reduced.

While these results might well be expected on a priori consideration, they warrant comment since they demonstrate that extension of peripheral limits by eye movement or the horizontal diameter of the field with the eye fixated at a maximum deviation point cannot be estimated by knowledge of the normal field limit (for that meridian) and maximum deviation of fixation in the same direction.

TABLE IVa

NORMAL MONOCULAR FIELD LIMITS WITH CENTRAL FIXATION AND MAXIMUM DEVIATION OF EYES MADE ON 6 INEXPERIENCED SUBJECTS AT 51 FOOT-CANDLES WITH 1° STIMULUS

Subject	Normal Field Limits				Maximum Deviation of the Eyes			
	Up	Down	In	Out	Up	Down	In	Out
A	62°	64°	60°	97°	57°	64°	55°	65°
B	38°	66°	62°	95°	34°	67°	48°	75°
C	45°	67°	61°	94°	55°	60°	52°	75°
D	36°	62°	59°	92°	40°	55°	60°	70°
E	37°	65°	55°	90°	33°	68°	56°	70°
F	61°	79°	63°	102°	66°	80°	57°	90°
Averages	46.5°	67°	60°	95°	47.5°	66°	55°	74°
S. D.	12.05	6.05	2.83	4.18	13.83	7.97	4.18	8.55

TABLE IVb

PERIPHERAL LIMITS OF THE HORIZONTAL FIELD WITH THE EYE AT MAXIMUM TEMPORAL FIXATION

Subject	Temporal deviation of eye from point of central fixation	Limits as measured to right and left from the point of maximum deviation	
		Nasal peripheral limit	Temporal peripheral limit
A	65°	83°	105°
B	75°	83°	83°
C	75°	85°	93°
D	70°	79°	88°
E	70°	63°	98°
F	90°	118°	82°
Averages	74°	85°	91.5°
S. D.	8.55	17.98	6.81

TABLE IVc

PERIPHERAL LIMITS OF THE VERTICAL FIELD WITH THE EYE AT MAXIMUM UP AND DOWN DEVIATIONS

Subject	UP			DOWN		
	Deviation	Peripheral limit measured from point of deviation	Extension beyond normal field limits	Deviation	Peripheral limit measured from point of deviation	Extension beyond normal field limits
A	57°	90°	28°	64°	90°	26°
B	34°	57°	29°	67°	82°	16°
C	55°	84°	39°	60°	81°	14°
D	40°	46°	10°	55°	74°	12°
E	33°	49°	12°	68°	80°	15°
F	66°	69°	8°	80°	85°	6°
Averages	47.5°	66°	21°	66°	82°	15°
S. D.	13.83	5.79	12.71	7.97	5.31	6.53

The increase in temporal peripheral limits when the eye is deviated from the central position could be utilized effectively for detecting objects to the side and rear when pilots are scanning the forward area and the instrument panel. This emphasizes the advantage which can be gained by designs permitting adequate side vision. Further, when satisfactory arrangements for full visibility are provided, the pilot and copilot together can cover a very large area by utilization of maximum deviations of the eyes and/or head movement.

The Visual Field as Enlarged by Head Movement in the Horizontal Plane (Eye Fixed, Shoulders Stationary)

Clark and Weddell[4] made a series of anthropometric measurements to determine the angle of rotation of the head around the vertical axis. Twenty subjects with a mean age of 19 were observed while looking through binoculars with the eyes fixed and the head rotating in the horizontal plane. The neck was kept free of all restrictions, since tight or thick clothing was found to reduce the range of movement considerably.

For this group, the front of the eye lay between 3 inches and 3.75 inches in front of the odontoid process (i.e., the pivot about which the skull rotates in the vertebral column). The mean distance was 3.33 inches.

The angle of rotation of the head in the horizontal plane to either side of the midline varied between 60° and 87° with a mean of 72°. It is evident that there is a rather wide range of head movement which apparently falls within normal limits.

The Extent of the Visual Field in the Horizontal Plane as Covered by Eye Movement Plus Head Movement

The mapping of visual fields with the eye fixed is entirely a laboratory procedure. In ordinary seeing, the eyes change fixation points constantly. Normally we move both eyes and head. This allows for distinct binocular vision over an area of approximately 200°.[15] With the head and eyes in motion and the body stationary, a path can be swept out which, although dependent on the distance of the object viewed (i.e., the radius), can exceed 360°. The entire area cannot, of course, be viewed simultaneously but is seen by successive fixa-

tions employing only head and eye movement. Major movements of the trunk, which per se are inefficient, should not be required of a pilot attempting to view the surrounding area.

The Visual Field as Enlarged by Head Movement and Eye Movement in the Vertical Plane (Shoulders Stationary)

A study made by the Army Air Forces of head and eye movements in sighting presents data based on 21 subjects. The total arc covered by a series of nine points at 22.5° intervals was 180°.[13] Since the study concerned a range within which good control fixation could be achieved, the outer field limits were not measured.

On the basis of the material which we have gathered, it seems likely that the extreme field limits in the vertical plane would extend beyond 180°. Table IVc indicates that, with the head stationary, an arc of 180° can be covered when the eyes are moved to the extreme up and down positions and the peripheral limits are taken at each position (subject A).

In looking directly upward, the head and eyes are rotated to an angle of 90°. With the eyes fixated in the mid-central position, the field limits might be assumed to be equivalent to those occurring when the head and eyes are in their customary plane. By making use of the average deviation of eyes up from the midposition with the head level (table IVc), it appears reasonable that a like deviation of 47° could be obtained with the head rotated upward 90°. Assuming further that the peripheral limits would remain relatively unchanged, visibility (i.e., recognition of form) to the extent of 66° beyond the 90° position might be regarded as possible. These remarks are speculative and are offered merely as a suggestion of the limits to which the maximum potential field is likely to extend.

When the head and eyes are brought into a position parallel with the floor, the body of the observer (seated) is a barrier to vision unless the trunk is bent forward or the eyes deviated right or left.

FACTORS AFFECTING THE SIZE OF THE VISUAL FIELD

It is desirable to present information on the influence of level of illumination and size of stimulus used on the form field and the fields for blue, green, and red, since this permits a more comprehensive evaluation of visibility requirements.

The effect of illumination on the apparent size of the form field. Much is known concerning the relationship between illumination and acuity, but very little has been done on the relationship between illumination and field size. A

TABLE V

AVERAGE RADIUS OF THE FIELD IN DEGREES*

Subject	Foot-candles of Illumination			
	7	0.0012	0.0004	0.00008
A	77	77	77	67
B	73	—	67	44
C	79	—	77	59
D	80	—	77	61
Average radius	77.25		74.5	65.25

*Field measurements expressed in terms of "average radius" refers to the average of all meridians from the point of central fixation. At times it will be necessary to describe field limits in terms of breadth of the horizontal plane and of the vertical plane from the point of central fixation.

TABLE VI

RELATIVE SIZE OF FORM FIELD AT THREE INTENSITIES WITH A 1° WHITE-ON-BLACK STIMULUS AS MEASURED FOR 3 INEXPERIENCED SUBJECTS

Subject	7 Foot-candles			17 Foot-candles			51 Foot-candles		
	Out	Up	Down	Out	Up	Down	Out	Up	Down
A	90°	38°	49°	93°	43°	62°	98°	47°	65°
B	90°	52°	61°	96°	54°	68°	99°	58°	69°
C	90°	56°	60°	94°	59°	62°	97°	62°	64°
Average	90°	49°	57°	94°	52°	64°	98°	58°	66°

From Ferree and Rand.[6]

study by Sharpley[14] indicates that at low intensities (7 foot-candles and less) the size of the form field does not diminish in proportion to the reduction in illumination (table V).

By progressively increasing the illumination, the size of the form field will be increased within certain limits, as is shown by results of our measurements on 3 subjects (table VI).

The effect of illumination on the size of the color fields. The color fields are more variable and more susceptible to changes in stimuli than is the form field. Wide individual differences occur among normal individuals. Ferree and Rand[6] measured the fields for blue, red, and green at intensities of 51 foot-candles, 17 foot-candles, 7 foot-candles, and 3 foot-candles with 1° Hering pigment stimuli. At 3 foot-candles the fields appear closely contracted about the region of central fixation, while at 51 foot-candles the fields for blue and red approach 90° in the temporal plane, with the field for green consistently narrower at all illumination levels (table VII). Abney[1] also found that variations in illumination caused similar variations in the color fields—that is, as the light intensity was changed in geometric progression, the size of the field increased in arithmetic progression so that the curve demonstrated a straight line relationship. It is interesting to note that the relationship occurs regardless of the particular color.

The size of the color field is a function of the intensity of the stimulus presented. A very strong stimulus is required to initiate response to color as the periphery is approached. This is due not to an absence of color vision in the more peripheral regions but to decreased sensitivity to color stimuli. By progressively increasing the intensity of illumination and the area of the stimulus all

TABLE VII

RELATIVE SIZE OF THE FIELDS FOR RED, BLUE, AND GREEN AT VARIED INTENSITIES WITH 1° STIMULI

Color	Intensities											
	51 f.c.			17 f.c.			7 f.c.			3 f.c.		
	Out	Up	Down	Out	Up	Down	Out	Up	Down	Out	Up	Down
Red	89°	45°	55°	80°	30°	45°	74°	28°	38°	54°	25°	30°
Blue	86°	48°	51°	75°	33°	46°	60°	26°	28°	52°	22°	24°
Green	55°	36°	31°	49°	25°	25°	46°	18°	23°	35°	17°	20°

From charts of Ferree and Rand.[6]

TABLE VIII

RELATIVE SIZE OF FORM FIELD AND FIELDS FOR RED, BLUE, AND GREEN MEASURED WITH STIMULI OF 1°, 2°, AND 5°

Color	Illumination in foot-candles	Size of Stimulus in Degrees								
		1°			2°			5°		
		Out	Up	Down	Out	Up	Down	Out	Up	Down
Red	7	68	30	33	85	35	45	99	52	65
Blue	7	66	25	23	77	35	43	90	48	65
Green	7	37	15	18	51	24	25	80	35	42
White	51	97	64	75	99	66	75	106	65	76

From charts of Ferree and Rand.[7]

color fields become coextensive with the form field.[5]

Effect of size of stimulus on the relative size of the form and color fields. The form field or visual field has been demonstrated to be fairly stable under widely varying conditions. Drastic reduction in illumination does not cause a corresponding contraction of the field. Similarly, the size of the stimulus presented has no very dramatic effect on the size of the form field. The color fields, however, are very sensitive to changes in stimulus size. For example, the color fields measured with 1° stimuli are only about half the size of the fields measured with 2° stimuli (table VIII).[7]

The effect of age and refractive errors on the size of the form field. An inspection of the distribution curve indicated by table IX shows some skewness to the left. If we selected our cut-off point at 72°, we would be restricting the range of only a relatively small percentage of the population. If this were treated as a normally distributed curve, we would expect to exclude slightly more than 4 per cent of the population. In this series, actual count revealed that 3 per cent of the group would be excluded by the cut-off point selected.

TABLE IX

THE DISTRIBUTION OF 200 NONPATHOLOGIC SUBJECTS WITH NORMAL VISION AND WITH REFRACTIVE ERRORS

Vision	Average Breadth of Field in 8 Principal Meridians Expressed in Degrees Mean Radii of Form Fields — 7 f.c. Illumination, 1° Stimulus									
	58°–59.9°	60°–61.9°	62°–63.9°	64°–65.9°	66°–67.9°	68°–69.9°	70°–71.9°	72°–73.9°	74°–75.9°	Total
Emmetropic			3	11	14	11	9	2		50
Hyperopic		2	2	17	30	15	6	2	1	75
Myopic	1	3	7	4	9	3	2	1		30
Presbyopic		2	13	12	11	2				40
Mixed Astigmatic			1	2	2					5
TOTAL	1	7	26	46	66	31	17	5	1	200

Based upon data from Ferree, Rand and Monroe.[8]

TABLE X

DISTRIBUTION OF 200 NONPATHOLOGIC SUBJECTS ACCORDING TO AGE GROUP AND FIELD SIZE

Age	Range of breadth of form field					Total
	58–61.9	62–65.9	66–69.9	70–73.9	74–77.9	
0 — 9			1			1
10 — 19		14	28	5		47
20 — 29	4	19	36	12	1	72
30 — 39	2	10	17	4		33
40 — 49	4	16	10			30
50 — 59		14	3			17
TOTAL	10	73	95	21	1	200

From charts of Ferree, Rand and Monroe.[10]

The effect of age and refractive errors on the size of the color fields. In general, it might be said that age and refractive errors are factors in determining the size of the color fields. The variability between individuals and between groups is greater than that observed in measurements of the form field[9] (tables X, XI, XII, and XIII). It might also be noted that no very large fields (more than 70°) occur above the age of 40, and no very small fields (less than 60°), below the age of 20 (table X).

Emmetropic and hyperopic individuals have the widest form fields, myopes the next widest, and presbyopes the narrowest. The differences between the emmetropes, hyperopes and myopes were not statistically significant. The values for the presbyopes did, however, differ significantly from those for the emmetropes, and from those for the myopes and hyperopes.*

While the emmetropic and hyperopic subjects have the widest fields for all colors, their field sizes do not differ significantly. Myopes, in the samples tested, have the largest scatter in the fields for red and blue, and their fields are significantly smaller for these colors than the fields taken for emmetropes and hyperopes. In the field for green, emmetropic, hyperopic, and myopic subjects have substantially the same field size and presbyopic individuals have fields which are definitely smaller.

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*Comparisons were made statistically between groups with normal vision and groups with various refractive errors for the form field and for the color fields of red, green, and blue. The statistical tables, which are not included in this paper, may be obtained from the files of the Civil Aeronautics Administration, Medical Division, Office of Aviation Safety, Washington 25, D. C.

TABLE XI

DISTRIBUTION OF 126 NONPATHOLOGIC SUBJECTS WITH NORMAL VISION AND REFRACTIVE ERRORS

	Mean radii of field for blue — 7 f.c. illumination — 1° stimulus																	
Vision	60–61.9	58–59.9	56–57.9	54–55.9	52–53.9	50–51.9	48–49.9	46–47.9	44–45.9	42–43.9	40–41.9	38–39.9	36–37.9	34–35.9	32–33.9	30–31.9	28–29.9	Total
Emmetropic			1	1	1	1	3	5	1	6	4	4		2				29
Hyperopic			1	1		3	6	6	8	10	7	5	3	2				52
Myopic	1			1				1	3	3	1	2	1	2	2	2		19
Presbyopic							1	1	1		2	2	6	1	4	2	1	21
Mixed Astigmatic								1					3		1			5
TOTAL	1		2	3	1	4	10	14	13	19	14	13	13	7	7	4	1	126

Data derived from Ferree, Rand and Monroe.[8]

TABLE XII

DISTRIBUTION OF 126 NONPATHOLOGIC SUBJECTS WITH NORMAL VISION AND REFRACTIVE ERRORS

	Mean radii of fields for red — 7 f.c. illumination — 1° stimulus																			
Vision	58–59.9	56–57.9	54–55.9	52–53.9	50–51.9	48–49.9	46–47.9	44–45.9	42–43.9	40–41.9	38–39.9	36–37.9	34–35.9	32–33.9	30–31.9	28–29.9	26–27.9	24–25.9	22–23.9	21.9	Total
Emmetropic					1	2	1	1	2	3	4	4	4	5	1	1					29
Hyperopic	1			1		2	1	4	4	6	8	7	4	7	7						52
Myopic	1					1			2		1	5	2	2	1	3		1			19
Presbyopic							1			2			1	4	3	7	2			1	21
Mixed Astigmatic										1				2					1	1	5
TOTAL	2	–	–	1	1	5	3	5	8	12	13	16	11	20	12	11	2	1	1	2	126

Data derived from Ferree, Rand and Monroe.[9]

TABLE XIII

DISTRIBUTION OF 119 NONPATHOLOGIC SUBJECTS WITH NORMAL VISION AND REFRACTIVE ERRORS

	Mean radii of fields for green — 7 f.c. illumination — 1° stimulus																				
Vision	46–47.9	44–45.9	42–43.9	40–41.9	38–39.9	36–37.9	34–35.9	32–33.9	30–31.9	28–29.9	26–27.9	24–25.9	22–23.9	20–21.9	18–19.9	16–17.9	14–15.9	12–13.9	10–11.9	8–9.9	Total
Emmetropic	1	1	1	1		1	1	2	2	2	3	3	5	2	3	1					29
Hyperopic				2	1	1	2	2	4	5	2	8	7	8	2	5	1				50
Myopic						2	1	1		1	2		1	3	2	1	2	1	1		18
Presbyopic								1	1	1	1		1		1	2	2	2	3	2	17
Mixed Astigmatic										1	2		1			1					5
TOTAL	1	1	1	3	1	4	4	6	7	10	10	11	15	13	8	10	5	3	4	2	119

Data derived from Ferree, Rand and Monroe.[2]

SUMMARY

1. The maximum monocular field possible for man is attained by good illumination and large stimuli. The largest field reported in the literature was measured by Roenne under photopic illumination with a 9° stimulus and is represented by a visual area 107° out, 62° in, 69° up, and 76° down. The average field for six subjects mapped at 51 footcandles with a 1° stimulus covered an area extending 95° out, 60° in, 47° up, and 67° down.
2. Absolute field size is increased when the eye is deviated from a central position. The peripheral limits measured from the points of maximum deviation of the eyes (i.e., measured with eye turned temporally as far as possible and with head and shoulders stationary) was found to be 92° out, 85° in, 66° up, and 82° down. These values are the averages of limits observed on six subjects.
3. The angle of rotation of the head in the horizontal plane was found to vary between 60° and 87°, with a mean of 72°.
4. An arc of 180° can be covered in the vertical position by raising and lowering the head 90° above and below the horizontal.
5. Maximum head and eye movements permit an area of more than 360° to be scanned (provided the distance between the viewer and the object is adequate) by a summation of fixation points over that range.
6. Theoretically, it would appear that in looking upward 90° with the eyes in the mid-central anatomic position in the head, with eye movement, the peripheral limits would extend to approximately 66° beyond 90°.
7. The level of illumination and the size of the stimulus used cause more variation in the size of the color fields than in the size of the form field.
8. Age (after 40 years) tends to narrow the visual field significantly.
9. Refractive errors affect the field to some extent—hyperopic and emmetropic individuals are conceded to have the largest fields, with myopic individuals having slightly smaller fields. The differences are not significant, however.
10. The specific data on the areas which can be viewed even under conditions of moderate head and eye movement serve to emphasize the practical advantage which might be gained by careful consideration of visibility factors in design.

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BOOK REVIEW

DOCUMENTA OPHTHALMOLOGICA: ADVANCES IN OPHTHALMOLOGY, vol. IV.

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News - - - Notes

NATIONAL COUNCIL TO COMBAT BLINDNESS, INC.

The National Council to Combat Blindness, Inc., launched its research program in the field of ophthalmology at a meeting of its Medical Board of Consultants by awarding $15,366 in grants-in-aid to five universities and institutions. Largest of the grants, $6,000, went to Boston City Hospital, where Dr. Hermann M. Burian will conduct an investigation on the electrical responses of the retina and the brain in patients with amblyopia ex anopsia and suppression. The University of Pennsylvania, Philadelphia, was granted $5,000. Dr. Harold G. Scheie will lead a study on virus infections of ocular tissues grafted onto the chorioallantoic membrane of the chick embryo. A grants-in-aid committee was formed, consisting of Phillips Thygeson, associate clinical professor of ophthalmology, University of California Medical School, Berkeley, chairman; Drs. Alson E. Braley, chief of department of ophthalmology, University Hospital, Iowa City; Daniel M. Gordon, assistant professor, department of ophthalmology, Cornell University Medical College; Stuart Mudd, professor of bacteriology, University of Pennsylvania School of Medicine, Philadelphia; Charles A. Perera, assistant clinical professor of ophthalmology, Columbia University College of Physicians and Surgeons, New York, and Samuel L. Saltzman, assistant clinical professor of ophthalmology, New York Medical College, Flower and Fifth Avenue Hospitals.

THE NATIONAL INTERPROFESSIONAL COMMITTEE ON EYE CARE

The National Interprofessional Committee on Eye Care, a group recently organized to consider methods of improving the eye care supplied to the public, and interprofessional relations of the various groups involved, held its first meeting Oct. 8, 1950, in Chicago.

This committee is comprised of representatives of the various societies in the fields of ophthalmology, optometry and opticianary.

At this first meeting at the Palmer House, held concurrently with the annual meeting of the American Academy of Ophthalmology and Otolaryngology, officers were elected, and agenda drawn up for discussion by the committee.

Dr. Avery Prangen, ophthalmologist, Mayo Clinic, Rochester, Minn., was chosen chairman for the coming year, and Mr. Leslie Myers, chairman of the Board, Benson Optical Company, Minneapolis, vice chairman. Elected secretary was Dr. Carel C. Koch, editor of the American Journal of Optometry and secretary of the American Academy of Optometry. Other members of the committee, in addition to the above-named officers, are Mr. Henry B. Carpenter, guild optician, Syracuse, New York; Dr. Frederick C. Cordes, professor of ophthalmology, University of California, San Francisco; Dr. Arthur M. Culler, professor of ophthalmology, Ohio State University, Columbus, Ohio; Dr. H. Ward Ewalt, Jr., optometrist, Pittsburgh, Pa.; Dr. Franklin M. Foote, executive director, National Society for the Prevention of Blindness, New York; Dr. Henry A. Imus, physicist, Office of Naval Research, Washington, D. C.; Mr. Norman A. MacLeod, wholesale optician, Providence, R. I.; Dr. Glenn H. Moore, optometrist, Chicago. Dr. William F. Hughes, Jr., professor of ophthalmology, University of Illinois, Chicago, will also serve on the committee as alternate.

Problems discussed at this first session included, besides organization, interprofessional relationships and various other topics relating to improving the optical eye care offered to the public by the several groups comprising the committee. In general, the public health aspects of optical eye care were stressed.

The second meeting of the National Interprofessional Committee on Eye Care is scheduled for December 17 in Chicago and will be held concurrently with the annual meeting of the American Academy of Optometry.

PAN AMERICAN ASSOCIATION OF OTO-RHINO-LARYNGOLOGY AND BRONCHO-ESOPHAGOLOGY

The Third Pan American Congress of Oto-Rhino-Laryngology and Broncho-

Esophagology will be held in Havana, Cuba, in 1952. For information write Dr. Chevalier L. Jackson, 3401 North Broad St., Philadelphia 40, Pa.

CALIFORNIA

The Los Angeles Society of Ophthalmology and Otolaryngology met Sept. 25, 1950. The program was a symposium on "Lacrimal Apparatus." Dr. Robert J. Schillinger spoke on "Probing of the Tear Duct," Dr. Paul H. Reed presented "Intra-Nasal Diathermy Operation on the Tear Sac," and Dr. Maurice W. Nugent gave a paper on "Dacryorhinostomy and Other Surgery for Tearing."

An $18,000 extension of the research laboratories of the division of ophthalmology at the University of California Medical School, San Francisco, has been completed. The extension provides three new research laboratories. Construction was financed by private patients treated by members of the staff of the division. One laboratory will be used in research on uveitis and a second in research on virus diseases of the eye. The third laboratory will be used for studies of radiation effects on the function of the eye.

FLORIDA

The graduate school of medicine of the University of Florida announces the fifth annual University of Florida Midwinter Seminar in Ophthalmology and Otolaryngology to be held at Miami Beach, Jan. 15-20, 1951. The first three days will be devoted to otolaryngology and distinguished lecturers for the courses will include Dr. Louis Clerf, Philadelphia; Dr. Gordon Hoople, Syracuse; Dr. D. M. Lierle, Iowa City; Dr. Benjamin Spector, Boston; and Dr. George Shambaugh, Chicago.

The last three days of the meeting the following ophthalmologists will lecture: Dr. Conrad Berens, New York; Dr. Ramon Castroviejo, New York; Dr. Jack Guyton, Baltimore; Dr. Harold Scheie, Philadelphia; and Dr. Edmund Spaeth, Philadelphia.

On Wednesday, January 16, the Southern Section of the American Laryngological, Rhinological and Otological Society will hold its meeting. Among the speakers will be Dr. C. L. Jackson, Philadelphia.

The Florida Society of Ophthalmology and Otolaryngology will also be holding its midwinter convention and registrants of the Seminar are invited to attend.

Registration fee for the Seminar is $40.00. For further information contact Dr. Walter T. Hotchkiss, 541 Lincoln Road, Miami Beach, Fla.

KANSAS

Dr. Albert N. Lemoine, Jr., has been appointed chairman of the department of ophthalmology at Kansas University School of Medicine, Kansas City. He succeeds Dr. John A. Billingsley, who is retiring because of illness but will remain active in the department. Dr. Lemoine received his medical degree from Washington University School of Medicine, St. Louis, in 1943. He did postgraduate work in ophthalmology at Harvard Medical School, Boston.

MINNESOTA

The library of the St. Louis County Medical Society will be incorporated as the David L. Tilderquist Memorial Library in honor of the Duluth ophthalmologist and otolaryngologist, the library's "best friend and most avid patron," who died September 26, 1948. The memorial corporation will be separate from the medical society.

The first fall meeting of the St. Louis Ophthalmic Society was held October 13. The program dealt with cortisone and ACTH. Dr. Cyril McBride of St. Louis spoke on "The General Background and Actions of Cortisone and ACTH," and Dr. John M. McLean of New York presented "The Uses of ACTH and Cortisone in Ophthalmology."

NEW YORK

Dr. Arthur G. De Voe has been appointed professor and chairman of the department of ophthalmology of New York University Post-Graduate Medical School. He will be in charge of all ophthalmologic teaching, research and patient care. For the past ten years Dr. De Voe has been a member of the staff of the Institute of Ophthalmology, Presbyterian Hospital. He served as a major in the medical corps of the U. S. Army during World War II. Since 1946 he has been senior consultant at the U. S. Veterans Administration Hospital in the Bronx.

He received his medical degree from Cornell University Medical School in 1935 and, in 1940, he was graduated from Columbia University with the degree of Doctor of Medical Science.

The regular meeting of the Brooklyn Ophthalmological Society was held October 19. Papers presented were "New Schema for Muscle Study," by Dr. Joseph I. Pascal (by invitation), and "Recent Advances in Glaucoma Therapeutics," by Dr. Irving H. Leopold (by invitation).

PENNSYLVANIA

The appointment of Dr. John S. McGavic as ophthalmologist to the Pennsylvania Hospital, Philadelphia, was announced recently.

Dr. McGavic, who resigned his post as an associate professor of ophthalmology at Temple University Medical School to assume his duties at Pennsylvania Hospital, is also attending ophthalmologist of the Bryn Mawr hospital, assistant pathologist at the Wills Eye Hospital in Philadelphia, and assistant professor of ophthalmology at the graduate school of medicine of the University of Pennsylvania.

The seventh annual joint meeting of the Berks County Medical Society and the Reading Eye, Ear, Nose and Throat Society was held Sept. 12, 1950. The meeting consisted of a panel discussion on "Bacterial Allergy." Papers presented were: "The Present Status of Bacterial Allergy" by Dr. Louis Tuft, Philadelphia; "Bacterial Allergy in Otorhinolaryngology" by Dr. Russell C. Grove, New York City; "The Role of Allergy in Rheumatic Fever" by Dr. John E. Gregory, Philadelphia; and "Tubercular Allergy" by Dr. Archibald R. Judd, Hamburg.

The Section on Ophthalmology of the College of Physicians and Surgeons of Philadelphia held its regular meeting October 19. Dr. Edmund B. Spaeth read a paper on "Replacement of Skin Graft by Basal Cell Carcinoma." A symposium on ACTH and cortisone was presented.

Participants were Dr. Harold G. Scheie, Dr. George Tyner (by invitation), Dr. John Buessler (by invitation), Dr. Arno Town, Dr. A. E. Rakoff, Dr. Irving H. Leopold, Dr. P. Robb McDonald, Dr. James E. Purnell (by invitation), Dr. Edward J. Cannon, and Dr. Charles G. Steinmetz.

CANADA

The University of Toronto, Faculty of Medicine, offers a postgraduate course in ophthalmology extending over three years. The graduate instruction in ophthalmology in the teaching hospitals in Toronto has been coordinated under the direction of the University. The first year on a Fellowship the student spends in one of the basic sciences of ophthalmology, and the final two years are spent on the intern service of one or more of the University teaching hospitals.

The fee for instruction is $50 per year payable to the Chief Accountant, University of Toronto. An application for appointment may be made to the professor of ophthalmology, Faculty of Medicine, University of Toronto. Appointments are made in December to commence on the following July 1.

The University of Toronto, Faculty of Medicine, announces a combined refresher course in ophthalmology and otolaryngology during the week of January 29 to February 3, 1951. Dr. Phillips S. Thygeson, University of California School of Medicine, and Dr. Charles E. Iliff, Johns Hopkins University, will be guest speakers in ophthalmology. Dr. LeRoy Schall, Harvard University, and Dr. G. B. Tremble, McGill University, will be guest speakers in otolaryngology. There will be surgical and medical clinics in these two subjects in addition to lectures by members of the Faculty.

The course will be given for a minimum of 10 students and a maximum of 25 students. Application may be made to the Dean of the Faculty of Medicine not later than November 30, 1950.

The Montreal Ophthalmological Society held its first meeting of the current season at the Royal Victoria Hospital on October 5. The following cases were reported: "Repair of Severe Laceration of the Globe," and "Magnet Removal of Intraocular Foreign Body," by Dr. A. L. Issenman; "Hyperkeratosis of the Conjunctiva and Essential Shrinkage," "Eales's Disease," and "Scleritis Treated with Beta Irradiation," by Dr. J. V. V. Nicholls; "Unusual Case of Acquired Cataract," by Dr. W. Fraser (by invitation); "Experiences with Cortisone in Eye Patients," by Dr. L. S. S. Kirschberg; "Marfan's

Syndrome," by Dr. G. H. Thompson (by invitation); "Groenouw's Dystrophy," by Dr. Wm. Turnbull; "Tuberculosis Treated by Streptomycin," and "Subconjunctival Lymphoma—Postoperative," by Dr. H. Duncan.

Drs. K. B. Johnston and S. Ramsey reported on the International Congress of Ophthalmology in London, England, July 1950.

POSITIONS AVAILABLE

The Department of Otolaryngology and Oral Surgery at the University of Iowa Medical School will have four residencies available July 1, 1951. Applications should be submitted by November 1, 1950, as the appointments are made December 1, 1950. If you are interested, please write the Department of Otolaryngology and Oral Surgery, University Hospitals, Iowa City, Iowa, for information.

The staff of the Lewistown Hospital, Lewistown, Pa., is interested in having a man certified in ophthalmology locate in Lewistown. Lewistown has a population of approximately 16,000 and is located in central Pennsylvania. Lewistown Hospital serves a prosperous agricultural area with a population of approximately 75,000. New construction is now under way which will give them a total of 186 beds plus 56 newborn bassinets. The Medical Staff consists of fourteen active members and thirty-three courtesy members plus two consulting and three honorary members. Write to Mr. Robert A. Kumpf, Administrator, Lewistown Hospital, Lewistown, Pa.

Ophthalmologist: A position for a resident in ophthalmology is available at the University of Texas Medical College, Galveston, Texas. For further information write Dr. William B. Potter, Chairman, Department of Ophthalmology, at the University.

Otolaryngologist: A position for a resident is available at the Episcopal Hospital, Philadelphia, Pa. For details write Dr. Otto C. Hirst, Episcopal Hospital, Philadelphia 25, Pa.

Listings of positions available should be sent to W. L. Benedict, M.D., 100 First Avenue Building, Rochester, Minn., by the fifth of the month preceding publication. They should include (1) type of physician wanted (ophthalmologist or otolaryngologist; diplomate, resident, etc.); (2) type of position to be filled; and (3) whom to write for further information. Unless otherwise requested, listings will be published once only.

The Academy will handle no further correspondence beyond the listing and assume no responsibility. Neither does it endorse or guarantee any of the published listings.

DIRECTORY OF OPHTHALMOLOGIC AND OTOLARYNGOLOGIC SOCIETIES

INTERNATIONAL

INTERNATIONAL ASSOCIATION FOR PREVENTION OF BLINDNESS
President: Dr. P. Bailliart, 47 Rue de Bellechasse, Paris, France
Secretary-General: Dr. A. Churchill, 66 Boulevard Saint-Michel, Paris, 6, France

INTERNATIONAL COUNCIL OF OPHTHALMOLOGY
President: Prof. F. W. Nordenson
Secretary: Dr. Halger Ehlers, Rigshospital, Copenhagen, Denmark

INTERNATIONAL ORGANIZATION AGAINST TRACHOMA
President: Dr. A. F. MacCallan
Secretary: Dr. F. Wibaut, P. C. Hoofstraat 145, Amsterdam, Holland

PAN-AMERICAN ASSOCIATION OF OPHTHALMOLOGY
President: Dr. Conrad Berens
Secretary: Dr. Thomas D. Allen, 122 South Michigan Avenue, Chicago 2, Ill.
Time and Place: IV Pan-American Congress of Ophthalmology early in 1952

PAN-AMERICAN ASSOCIATION OF OPHTHALMOLOGY, PUERTO RICO CHAPTER
President: Dr. Luis J. Fernandez, Box 2206, San Juan 10, Puerto Rico
Secretary: Dr. P. Fernandez
Place: San Juan

PAN-AMERICAN ASSOCIATION OF OTO-RHINO-LARYNGOLOGY AND BRONCHO-ESOPHAGOLOGY
President: Prof. Justo Alonso
Secretary: Dr. Chevalier L. Jackson, 255 South 17th Street, Philadelphia, Pa.

FOREIGN

ALL-INDIA OPHTHALMOLOGICAL SOCIETY
President: Dr. G. Zachariah
Secretaries: Dr. S. N. Cooper and Dr. V. K. Chitnis, Laud Mansion, Queen's Road, Bombay 4, India

AUSTRIAN OTOLARYNGOLOGICAL SOCIETY, VIENNA
President: Prof. Dr. E. Schlander
Secretary: Doz. Dr. O. Novotny, Vienna IX, Alserstrasse 4, Austria
Time and Place: Annually

BELGIAN OPHTHALMOLOGIC SOCIETY
President: Dr. L. Weekers
Secretary-General: Dr. M. Appelmans, Avenue Ruelens 179, Louvain
Time and Place: January, June and November. Bruxelles

BOMBAY OPHTHALMOLOGISTS' ASSOCIATION
Chairman: Rotated
Conveners: Dr. S. N. Cooper and Dr. B. D. Telang, Laud Mansion 21, Queen's Road, Bombay 4
Time and Place: 7:30 p.m., third Wednesday of each month. The seven ophthalmic hospitals of Bombay by rotation

BRITISH ASSOCIATION OF OTOLARYNGOLOGISTS
President: Mr. H. V. Forster
Honorary Secretary: Mr. F. C. W. Capps, 45 Lincoln's Inn Fields, London W. C. 2, England

BRITISH MEDICAL ASSOCIATION, SECTION ON OPHTHALMOLOGY
President: Mr. O. G. Morgan
Secretary: Mr. A. G. Cross, 27 Harley Street, London W. 1, England

CHENGTU OPHTHALMOLOGICAL SOCIETY
President: Dr. Eugene Chan
Secretary: Dr. D. S. Shen, Eye, Ear, Nose and Throat Hospital, Chengtu, Szechuan, China
Place: Eye, Ear, Nose and Throat Hospital, Chengtu, Szechuan, China

CHINESE OPHTHALMOLOGY SOCIETY
President: Dr. C. H. Chou
Secretary: Dr. F. S. Tsang, 221 Foochow Road, Shanghai

CHINESE OPHTHALMOLOGICAL SOCIETY OF PEKING
President: Dr. G. C. Lin
Secretary: Dr. H. L. Chen, Ophthalmological Dept., Peking University Medical School, Peking
Time: Bimonthly

DEUTSCHE OPHTHALMOLOGISCHE GESELLSCHAFT HEIDELBERG
President: Prof. Dr. med. K. Wessely
Secretary: Prof. Dr. med. E. Engelking, Heidelberg, Universitäts-Augenklinik

FACULTY OF OPHTHALMOLOGISTS
President: Dr. Frank W. Law, 45 Lincoln's Inn Fields, London, W.C. 2, England
Secretary: Dr. J. H. Doggart, F.R.C.S.

GERMAN OPHTHALMOLOGICAL SOCIETY
President: Prof. W. Lohlein
Secretary: Prof. E. Engelking, Heidelberg

HUNGARIAN MEDICAL TRADE UNION, SECTION OF OPHTHALMOLOGY
President: I. Csapody
Secretary: E. Galla, Krisztina Körut 139, Budapest, Hungary
Time and Place: Bimonthly. Second Eye Clinic, Budapest

HUNGARIAN OPHTHALMOLOGICAL SOCIETY
President: Prof. G. Horay
Assistant Secretary: Dr. Stephen de Grosz, University Eye Hospital, No. 1, Illesucca 15, Budapest

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Secretaries of societies are requested to furnish the information necessary to make this list complete and keep it up to date.

ISRAEL OPHTHALMOLOGICAL SOCIETY
President: Dr. Aryeh Feigenbaum
Secretary: Dr. E. Sinai, 9 Bialik Street, Tel Aviv

MIDLAND OPHTHALMOLOGICAL SOCIETY
President: Dr. F. A. Anderson
Secretaries: Dr. P. Jameson Evans, 51 Calthorpe Road, Edgbaston, Birmingham 15, England
Dr. R. D. Weeden Butler, 18 Highfield Road, Edgbaston, Birmingham 15, England
Place: Birmingham and Midland Eye Hospital, Church Street, Birmingham 3, England

NEDERLANDSCH OOGHEELKUNDIG GEZELSCHAP
President: Prof. A. W. Mulock Houwer
Secretary: Dr. T. A. Vos, Laan v. Meerdervoort 394, the Hague

NORTH OF ENGLAND OPHTHALMOLOGICAL SOCIETY
President: Mr. J. S. Arkle
Secretary: Mr. W. M. Muirhead, 70 Upper Hanover Street, Sheffield 3, England
Time and Place: October to May. Manchester, Leeds, Newcastle, Liverpool, Sheffield and Bradford

THE NOVA SCOTIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. D. M. MacRae
Secretary-Treasurer: Dr. E. I. Glenister, 513 Barrington Street, Halifax, Nova Scotia
Time: Four times yearly at dates to be arranged by the Executive

OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY OF ALBERTA
President: Dr. C. G. Elder
Secretary: Dr. M. R. Marshall, Wells Pavilion, University Hospital, Edmonton, Alberta, Canada

OPHTHALMOLOGICAL SOCIETY OF AUSTRALIA
President: Dr. Arthur H. Joyce
Secretary: Dr. Arnold L. Lance, 135 Macquarie Street, Sydney, New South Wales

OPHTHALMOLOGICAL SOCIETY OF COPENHAGEN
President: Prof. Dr. Holger Ehlers
Secretary: Dr. Carl Johan Moellenbach, Rigshospitalets oejenafdeling, Copenhagen O, Denmark
Place: Rigshospitalets oejenafdeling

OPHTHALMOLOGICAL SOCIETY OF EGYPT
President: Dr. Ibrahim Ahmad Mohammad
Secretary: Dr. Mahmoud Lutfi, Ophthalmic Hospital, Giza
Time and Place: Annual meeting during March. Summer meeting during August. Dar El Hekmah, 42 Kasr El Ainy Street, Cairo, Egypt

OPHTHALMOLOGICAL SOCIETY OF HOSPITAL DE NUESTRA SENORA DE LA LUZ
Chairman: Dr. Manuel J. Icaza y Dublan
Secretary: Dr. Jorge Meyran, Ezequiel Montes 135, México, D. F.
Time and Place: Second Friday of each month. Hospital de Neustra Senora de la Luz

OPHTHALMOLOGICAL SOCIETY OF NEW ZEALAND
President: Dr. L. S. Talbot
Secretary: Dr. W. J. Hope-Robertson, Kelvin Chambers, 16 The Terrace, Wellington
Time and Place: Annually. Auckland, Wellington, Christchurch and Dunedin alternately

OPHTHALMOLOGICAL SOCIETY OF SOUTH AFRICA
President: Dr. M. Fine
Secretary: Dr. R. L. H. Townsend, National Mutual Building, Church Square, Cape Town

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM
President: Mr. M. H. Whiting
Honorary Secretaries: Mr. A. G. Cross and Mr. A. J. B. Goldsmith, 45 Lincoln's Inn Fields, London W. C. 2, England
Time and Place: 1951 Congress of the Society, March 29-31, London

OXFORD OPHTHALMOLOGICAL CONGRESS
Master: Dr. F. A. Anderson
Hon. Secretary and Treasurer: Ian C. Fraser, F.R.C.S., Red Roofs, Kingsland, Shrewsbury
Time and Place: No meeting in 1950 due to International Meeting in London in June.
Next meeting first week of July 1951, Oxford

PHILIPPINE OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY
President: Dr. Geminiano de Ocampo
Secretary-Treasurer: Dr. Carlos V. Yambao, Philippine General Hospital, Manila

POLISH OPHTHALMOLOGICAL SOCIETY
President: Prof. Dr. W. Kapuscinski
Secretary: Dr. S. Topolski, Piusa 38, Warsaw, Poland
Time and Place: Every two years—summer. Ophthalmic Clinic, Oczki 6, Warsaw

ROYAL SOCIETY OF MEDICINE, SECTION OF OPHTHALMOLOGY
President: Montague Hine, F.R.C.S.

SAO PAULO SOCIETY OF OPHTHALMOLOGY
President: Dr. Durval Prado
Secretary: Dr. Rubens Belfort Mattos, Rua B. Stapetininga, 29 F-3° andar, Sao Paulo, Brazil

SCOTTISH OPHTHALMOLOGICAL CLUB
President: Dr. E. H. Cameron
Secretary: Dr. John Marshall, 11 Claremont Gardens, Glasgow, C.3, Scotland
Time and Place: Last Saturday of March and October, Edinburgh and Glasgow, in rotation

SOCIEDAD ARGENTINA DE OFTALMOLOGIA
President: Dr. Diego M. Arguello
Secretary: Dr. Pedro F. Garcia Nocito, Vicente Lopez 1756 A, Buenos Aires, Argentina
Time and Place: Third Wednesday of every month. Buenos Aires
Secretaries: Arthur Lister, F.R.C.S., 56 Wimpole Street, London, W.1., England
H. E. Hobbs, F.R.C.S., 129 Harley Street, London, W.1., England

SOCIEDAD CHILENA DE OFTALMOLOGIA

President: Dr. Italo Martini
Secretary: Dr. Adrian Araya Costa, Renaca, no. 34, Santiago, Chile
Place: Santiago

SOCIEDAD COLOMBIANA DE OFTALMOLOGIA Y DE OTORRINOLARINGOLOGIA

President: Dr. Jorge Suarez-Hoyos, Carrera 5a, no. 13-39, Bogota, Colombia
Secretary: Dr. Francisco Arango
Time and Place: Second Tuesday of each month. Club Medico

SOCIEDAD CUBANA DE OFTALMOLOGIA

President: Prof. Lorenzo Comas
Secretary: Dr. Heriberto Buch Granados, Calle B No. 668 ent. 27 y 29, Vedado, Habana, Cuba
Time and Place: First Thursday bi-monthly. Malecon No. 61 Bajos, Havana, Cuba

SOCIEDAD MEXICANA DE OFTALMOLOGIA

President: Dr. Teodulo M. Agundis
Secretary: Dr. Jose Luis Arce, Viena 3-5, Mexico D. F., Mexico
Time and Place: 8:30 p.m., first Tuesday of each month, Gral. PRIM 47

SOCIEDAD DE OFTALMOLOGIA DE CORDOBA

Chairman: Dr. Roberto Obregon Oliva
Secretary: Dr. Alberto Urrets Zavalia (hijo), 27 de Abril 255, Cordoba, Argentina

SOCIEDAD DE OFTALMOLOGIA DE GUADALAJARA

President: Dr. Elias Mendoza Gonzalez
Secretary: Dr. Jose Martin del Campo, Av. Juarez 211, Desp. 314, Guadalajara, Jal.
Place: Edificio Lutencia Despacho 101

SOCIEDAD DE OFTALMOLOGIA DEL LITORAL

President: Dr. Juan Manuel Vila Ortiz, Cordoba 1915, Rosario, Argentina
Secretary: Dr. Carlos M. Soto
Time and Place: Last Sunday in every month. Rosario

SOCIEDADE BRASILEIRA DE OFTALMOLOGIA

President: Dr. Natalicio de Farias
Secretary: Dr. Ismar Pereira, Praca Floriano 55, 5° andar, Rio de Janeiro, Brazil
Time: Third Friday of every month from April to December

SOCIEDADE DE OFTALMOLOGIA DEL NORTE

President: Dr. Jorge Luis Castillo
Secretary: Dr. Felix Berman, San Lorenzo 345, Tucuman, Argentina
Place: Mendoza 421, Tucuman

SOCIEDADE DE OFTALMOLOGIA DE MINAS GERAIS

President: Prof. Hilton Rocha
Secretary: Dr. Oswaldo Carvalho
Place: Belo Horizonte, Minas Gerais, Brazil

SOCIEDADE DE OFTALMOLOGIA E OTORINOLARINGOLOGIA DE RIO GRANDE DO SUL

President: Dr. Luiz Assumpcao Osorio
Secretary: Dr. Fernando Voges Alves, Caixa Postal 928, Porto Alegre, Rio Grande do Sul

SOCIEDADE DE OTO-RINO-LARINGOLOGIA DO RIO DE JANIERO

President: Dr. Aloysio Novis
Secretaries: Dr. Rubens Cabral, Rua Paissandu 73, Rio de Janeiro, Brazil
Dr. Mairelles Vieira

SOCIEDADE DE OFTALMOLOGIA E OTO-RHINO-LARYNGOLOGIA DE BAHIA

President: Dr. Theonilo Amorim, Barra Avenida, Bahia, Brazil
Secretary: Dr. Adroaldo de Alencar

SOCIETA OFTALMOLOGICA ITALIANA

President: Prof. Giuseppe Ovio
Secretary: Prof. E. Leonardi, Piazza degli Eroi, 11 Roma, Italy
Place: Roma Piazza degli Eroi 11

SOCIETE BELGE D'OPHTALMOLOGIE

President: Dr. L. Weekers
Secretary-General: Dr. M. Appelmans, 179 avenue Reulens, Louvain, Belgium
Time: Last Sunday of February, June and November

SOCIETE FRANCAISE D'OPHTHALMOLOGIE

Secretary-General: Dr. Edward Hartmann, Hospital Lariboisiere, Paris 10, France

SOCIETY OF SWEDISH OPHTHALMOLOGISTS

President: Prof. S. Larsson
Secretary: Dr. K. O. Granstrom, Sodermalmstorg 4, Stockholm, Sweden

SOUTHERN OPHTHALMOLOGICAL SOCIETY, ENGLAND

President: R. Lang, M.R.C.S.
Hon. Secretary and Treasurer: Nigel Cridland, D.M., D.O., 25 Craneswater Park, Southsea, England

NATIONAL

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

President: Dr. J. Mackenzie Brown
Executive Secretary-Treasurer: Dr. William L. Benedict, 100 First Avenue Building, Rochester, Minn.
Time and Place: October 8-13, Chicago

AMERICAN ASSOCIATION OF EYE, EAR, NOSE AND THROAT SOCIETY SECRETARIES

President: Dr. Kenneth L. Craft
Secretary-Treasurer: Dr. Daniel S. DeStio, Highland Building, Pittsburgh 6, Pa.

AMERICAN LARYNGOLOGICAL ASSOCIATION

President: Dr. Gordon B. New
Secretary: Dr. Louis H. Clerf, 1530 Locust, Philadelphia 2, Pa.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.
President: Dr. Robert C. Martin
Secretary: Dr. C. Stewart Nash, 708 Medical Arts Building, Rochester 7, N. Y.
EASTERN SECTION
Vice-President: Dr. Robert L. Moorhead
Secretary: Dr. Francis W. Davison, Geisinger Memorial Hospital, Danville, Pa.
MIDDLE SECTION
Vice-President: Dr. J. Marion Sutherland
Secretary: Dr. Walter H. Theobald, 307 North Michigan Avenue, Chicago 1, Ill.
SOUTHERN SECTION:
Vice-President: Dr. William D. Stinson
Secretary: Dr. Lewie M. Griffith, 301 Haywood Building, Asheville, N. C.
WESTERN SECTION:
Vice-President: Dr. Jesse B. Naftzger
Secretary: Dr. Russell M. Decker, 65 North Madison Avenue, Pasadena, Calif.

AMERICAN MEDICAL ASSOCIATION, SCIENTIFIC ASSEMBLY, SECTION ON OPHTHALMOLOGY
Chairman: Dr. A. Ray Irvine
Secretary: Dr. Trygve Gundersen, 101 Bay State Road, Boston, Mass.

AMERICAN MEDICAL ASSOCIATION, SECTION ON LARYNGOLOGY, OTOLOGY AND RHINOLOGY
Chairman: Dr. James M. Robb
Secretary: Dr. Sam H. Sanders, 1089 Madison Avenue, Memphis 3, Tenn.

AMERICAN OPHTHALMOLOGICAL SOCIETY
President: Dr. John H. Dunnington
Secretary-Treasurer: Dr. Maynard C. Wheeler, 30 West 59th Street, New York 19, N. Y.
Time and Place: Eighty-seventh annual meeting, June 7-9, 1951, Greenbrier Hotel, White Sulphur Springs, W. Va.

AMERICAN OTOLOGICAL SOCIETY
President: Dr. Kenneth Day
Secretary: John R. Lindsay, 950 East 59th Street, Chicago 37, Ill.

AMERICAN SOCIETY OF OPHTHALMOLOGIC AND OTOLARYNGOLOGIC ALLERGY
President: Dr. George E. Shambaugh, Jr.
Secretary-Treasurer: Dr. Joseph W. Hampsey, 806 May Building, Pittsburgh, Pa.

ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY, INC.
Chairman: Dr. Walter H. Fink
Secretary-Treasurer: Dr. James H. Allen, 1430 Tulane Avenue, New Orleans, La.

CANADIAN MEDICAL ASSOCIATION, SECTION ON OPHTHALMOLOGY
President: Dr. R. G. C. Kelly
Secretary: Dr. J. Clement McCulloch, 380 Medical Arts Building, Toronto, Ontario

CANADIAN OPHTHALMOLOGICAL SOCIETY
President: Dr. R. F. Nicholls
Secretary: Dr. J. F. A. Johnston, 174 St. George Street, Toronto, Ontario

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS, INC.
President: Mr. Mason H. Bigelow
Secretary: Dr. Franklin M. Foote, 1790 Broadway, New York 19, N. Y.

REGIONAL

ARK-LA-TEX OTO-OPHTHALMIC SOCIETY
President: Dr. W. Griffin Jones
Secretary: Dr. Frank L. Bryant, 2622 Greenwood, Shreveport, La.
Time and Place: First Monday of month, October through May. Shreveport Club

HAWAII EYE, EAR, NOSE AND THROAT SOCIETY
Chairman: Dr. Robert T. Wong
Secretary: Dr. Ogden D. Pinkerton, Suite 7, Young Building, Honolulu 13, T. H.
Time and Place: Third Thursday of each month (dinner meetings). Pacific Club, Honolulu

INTER-MOUNTAIN OTO-OPHTHALMOLOGICAL SOCIETY
President: Dr. R. O. Porter
Secretary: Dr. Harry O. Frazier, 707 Medical Arts Building, Salt Lake City 1, Utah
Time and Place: Third Monday of each month, September through May. University Club, 136 East South Temple, Salt Lake City

LOUISIANA-MISSISSIPPI OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY
President: Dr. S. B. Carruthers
Secretary: Dr. Edley H. Jones, 1301 Washington Street, Vicksburg, Miss.
Time and Place: Mississippi Gulf Coast, May 14, 1951

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY
President: Dr. Benjamin A. Sachs
Secretary: Dr. Garrett L. Sullivan, 101 Bay State Road, Boston 15, Mass.
Time and Place: Third Wednesday of each month, November through April. Massachusetts Eye and Ear Infirmary

NEW ENGLAND OTO-LARYNGOLOGICAL SOCIETY
President: Dr. Robert L. Goodale
Secretary-Treasurer: Dr. Burton E. Lovesey, 76 Bay State Road, Boston 15, Mass.
Time and Place: Quarterly. Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston

PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY
President: Dr. David R. Higbee
Secretary-Treasurer: Dr. C. Allen Dickey, 450 Sutter Street, San Francisco, Calif.

SAGINAW VALLEY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. William B. Hubbard
Secretary: Dr. Frank A. Ware, 514 Genesee Bank Bldg., Flint, Mich.
Time and Place: Second Tuesday evening of each month, except summer months. Bancroft Hotel, Saginaw

SIOUX VALLEY EYE AND EAR ACADEMY
President: Dr. James Reeder, Jr.
Secretary-Treasurer: Dr. W. P. Davey, 627-632 Frances Building, Sioux City, Iowa

SOUTHERN MEDICAL ASSOCIATION, SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY
Chairman: Dr. Alston Callahan
Secretary: Dr. Edley H. Jones, 1301 Washington Street, Vicksburg, Miss.
Time and Place: November 13-16. St. Louis, Mo.

STATE

ARKANSAS STATE MEDICAL SOCIETY, EYE, EAR, NOSE AND THROAT SECTION
President: Dr. C. G. Hinkle
Secretary: Dr. K. W. Cosgrove, 113 East Capitol Avenue, Little Rock, Ark.

CALIFORNIA MEDICAL ASSOCIATION, EYE, EAR, NOSE AND THROAT SECTION
Chairman: Dr. George F. Keiper, Jr.
Secretary: Dr. Maurice W. Nugent, 2007 Wilshire Blvd., Los Angeles 5, Calif.

COLORADO OPHTHALMOLOGICAL SOCIETY
President: Dr. J. Leonard Swigert
Secretary: Dr. James C. Strong, 227 Sixteenth Street, Denver, Colo.
Time and Place: Every third Saturday. Colorado Medical Center

COLORADO OTOLARYNGOLOGICAL SOCIETY
President: Dr. Guy W. Smith
Secretary: Dr. Terry J. Gromer, 110 Metropolitan Building, Denver, Colo.
Time and Place: 6:30 p.m., first Saturday evening of each month. Oxford Hotel, Denver

FLORIDA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. W. Jerome Knauer
Secretary-Treasurer: Dr. Charles C. Grace, 145 King Street, St. Augustine, Fla.

GEORGIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Lester A. Brown
Secretary: Dr. Braswell E. Collins, 701 Elizabeth Street, Waycross, Ga.
Time and Place: First Friday and Saturday of March. General Oglethorpe Hotel, Savannah, Ga.

INDIANA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. E. W. Dyar
Secretary-Treasurer: Dr. M. S. Harding, 308 Hume Mansur Building, Indianapolis, Ind.

IOWA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Byron Merkel
Secretary: Dr. Carl A. Noe, 601-611 Highley Building, Cedar Rapids, Iowa
Time and Place: 1950, Des Moines

KANSAS STATE MEDICAL SOCIETY, SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. N. L. Francis
Secretary: Dr. W. D. Pitman, First National Bank Building, Pratt, Kan.

MICHIGAN STATE MEDICAL SOCIETY, SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY
Chairman: Dr. J. E. Croushore (Otolaryngology)
Co-Chairman: Dr. J. C. Gemeroy (Ophthalmology)
Secretary: Dr. R. W. Teed, 215 South Main, Ann Arbor, Mich. (Otolaryngology)
Co-Secretary: Dr. F. B. Heckert, 1105 Bank of Lansing Building, Lansing, Mich. (Ophthalmology)

MICHIGAN TRIOLOGICAL SOCIETY
President: Dr. William D. Irwin
Secretary: Dr. V. E. Cortopassi, 324 South Washington Avenue, Saginaw, Mich.
Time: Second Thursday of November, December, March, April and May

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Malcolm C. Pfunder
Secretary-Treasurer: Dr. Frank Adair, 822 Lowry Medical Arts Building, St. Paul 2, Minn.
Time and Place: Second Friday of each month, November through May. Alternating, Minnesota Club, St. Paul, and Minneapolis Club, Minneapolis

MONTANA ACADEMY OF OTO-OPHTHALMOLOGY
President: Dr. W. L. Forster
Secretary-Treasurer: Dr. F. D. Hurd, Medical Arts Building, Great Falls, Mont.
Time and Place: Semi-annually. Summer, Bozeman; mid-winter, Diamond S Ranchotel, Boulder

NORTH CAROLINA EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. G. M. Billings
Secretary: Dr. MacLean B. Leath, 529 North Main Street, High Point, N. C.
Time and Place: Annually, beginning second Monday in September. 1950 meeting, September 11-13, Hendersonville, N. C., with the South Carolina Eye, Ear, Nose and Throat Society.

OREGON ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Max Simons
Secretary: Dr. Richard S. Fixott, 1020 Southwest Taylor Street, Portland 5, Ore.
Time and Place: Third Tuesday each month September through May. Old Heathman Hotel, Portland

PENNSYLVANIA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Jay G. Linn
Secretary: Dr. Daniel S. DeStio, Highland Building, Pittsburgh 6, Pa.
Time and Place: May 17-20, 1951. Galen Hall, Wernersville, Pa.

PUERTO RICO MEDICAL ASSOCIATION, SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Luis J. Fernandez
Secretaries: Dr. Ricardo F. Fernandez, P.O. Box 2206, San Juan 10, Puerto Rico (Ophthalmology)
Dr. Carlos E. Munoz MacCormick, P.O. Box 604, San Juan, Puerto Rico (Otolaryngology)
Time and Place: Bimonthly. Puerto Rico Medical Association Building

SOUTH CAROLINA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. William M. Carpenter
Secretary-Treasurer: Dr. Roderick Macdonald, Rock Hill, S. C.
Time and Place: September 11-13. Hendersonville, N. C. (jointly with North Carolina Eye, Ear, Nose and Throat Society)

TENNESSEE STATE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Sam H. Sanders
Secretary-Treasurer: Dr. Roland H. Myers, 1720 Exchange Building, Memphis, Tenn.
Time: Annually

TEXAS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. V. R. Hurst
Secretary: Dr. John L. Matthews, 414 Navarro Street, San Antonio 5, Texas
Time and Place: December 1950. Dallas

VIRGINIA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Francis H. McGovern
Secretary-Treasurer: Dr. Peter N. Pastore, Box 25, Medical College of Virginia Station, Richmond 19, Va.

WEST VIRGINIA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Garnett P. Morison
Secretary: Dr. Melvin W. McGehee, 425 Eleventh Street, Huntington 1, W. Va.
Time: Biannual

LOCAL

ACADEMY OF MEDICINE OF NORTHERN NEW JERSEY, SECTION ON EYE, EAR, NOSE AND THROAT
Chairman: Dr. Anthony M. Sellitto
Secretary: Dr. Francis J. Grant, 1224 Salem Avenue, Hillside, N. J.
Time and Place: Second Monday of the month. The Academy of Medicine, 91 Lincoln Park, South, Newark

AKRON ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. C. R. Anderson
Secretary-Treasurer: Dr. A. L. Peter, 406 Akron Savings and Loan Building, Akron, Ohio
Time and Place: 6:30 p.m., first Monday in January, March, May and November. Akron City Club

ATLANTA EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. Lester A. Brown
Secretary-Treasurer: Dr. James T. King, 384 Peachtree Street N.E., Atlanta 3, Ga.
Time and Place: 7:30 p.m., fourth Monday of each month, October to May. Academy of Medicine

BIRMINGHAM EYE, EAR, NOSE AND THROAT SOCIETY
President: Each member, in alphabetical order.
Secretary: Dr. David A. McCoy, Woodward Building, Birmingham, Ala.
Time and Place: 6:30 p.m., second Tuesday of each month, September through May. Thomas Jefferson Hotel

BOSTON CITY HOSPITAL AURAL AND OPHTHALMIC ASSOCIATION
President: Dr. Joseph Nerbonne
Secretary: Dr. Benjamin Riseman, 41 Bay State Road, Boston 15, Mass.

BROOKLYN OPHTHALMOLOGICAL SOCIETY
President: Dr. Mortimer A. Lasky
Secretary-Treasurer: Dr. Louis Freimark, 256 Rochester Avenue, Brooklyn 13, N. Y.
Time and Place: 8 p.m., third Thursday in October, December, February and April. Medical Society of the County of Kings, 1313 Bedford Avenue

BUFFALO OPHTHALMOLOGIC CLUB
President: Dr. Arthur L. Bennett
Secretary: Dr. Herbert R. Reitz, 446 Linwood Avenue, Buffalo, N. Y.
Time and Place: Second Thursday of each month, October through May. Park Lane

CENTRAL ILLINOIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Harold R. Watkins
Secretary-Treasurer: Dr. Philip R. McGrath, 843 Jefferson Building, Peoria, Ill.
Time and Place: September 22-24, Abraham Lincoln Hotel, Springfield

CENTRAL NEW YORK EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. Cecil B. Hert
Secretary-Treasurer: Dr. James L. McGraw, 619 University Building, Syracuse, N. Y.

CENTRAL WISCONSIN SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. A. G. Dunn
Secretary: Dr. G. L. McCormick, 650 South Central Avenue, Marshfield, Wis.

CHATTANOOGA EYE, EAR, NOSE AND THROAT SOCIETY
Chairman and Secretary: Dr. Willard H. Steele, Jr., 552 McCallie Avenue, Chattanooga, Tenn.
Time and Place: 6:30 p.m., fourth Thursday in each month, October through May. Mountain City Club

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY
President: Dr. Oliver E. Van Alyea
Secretary: Dr. Lawrence J. Lawson, 636 Church Street, Evanston, Ill.

CHICAGO OPHTHALMOLOGICAL SOCIETY
President: Dr. J. Robert Fitzgerald
Secretary-Treasurer: Dr. Gail E. Soper, 636 Church Street, Evanston, Ill.
Time and Place: 7:30 p.m., third Monday of each month, October to May. Chicago-Illini Union, 715 S. Wood Street

CINCINNATI OPHTHALMOLOGIC CLUB
Presidium: Dr. Donald J. Lyle, Dr. Karl W. Ascher, Dr. Josef D. Weintraub
Secretary: Dr. Josef D. Weintraub, 715 Provident Bank Building, Seventh and Vine Streets, Cincinnati, Ohio
Time and Place: Second Wednesday night of month, November through May. University Club, Fourth and Broadway

CLEVELAND OPHTHALMOLOGICAL CLUB
President: Dr. G. Leslie Miller
Secretary-Treasurer: Dr. Webb P. Chamberlain, Jr., 7405 Detroit Avenue, Cleveland, Ohio
Time and Place: Second Tuesday of November, January, February and April. Statler Hotel, Cleveland

COLLEGE OF PHYSICIANS OF PHILADELPHIA, SECTION ON OPHTHALMOLOGY
Chairman: Dr. Wilfred E. Fry
Clerk: Dr. M. Luther Kauffman, Medical Arts Building, Jenkintown, Pa.
Time and Place: 8:15 p.m., third Thursday of every month, October through April. College of Physicians Building

DALLAS ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. W. B. Wilkinson
Secretary: Dr. Claude D. Winborn, Medical Arts Building, Dallas 1, Texas
Time and Place: First Tuesday of each month. Melrose Hotel

DES MOINES ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. J. H. McNamee
Secretary-Treasurer: Dr. H. H. Gurau, 213 Bankers Trust Building, Des Moines, Iowa
Time and Place: 6:00 p.m., fourth Monday of each month, September through May. Des Moines Club

DETROIT OPHTHALMOLOGICAL SOCIETY
President: Dr. Cecil Lepard
Secretary: Dr. Arthur P. Wilkinson, 974 Fisher Building, Detroit 2, Michigan
Time and Place: Second Monday of each month, November through April. Wayne County Medical Society

DETROIT OTO-LARYNGOLOGICAL SOCIETY
President: Dr. B. F. Glowacki
Secretary-Treasurer: Dr. John R. Birch, 1010 Maccabees Building, Detroit 2, Mich.
Time and Place: Third Wednesday of each month, September to May. Wayne County Medical Society Building

EASTERN NEW YORK EYE, EAR, NOSE AND THROAT ASSOCIATION
President: Dr. Byron H. Porter
Secretary-Treasurer: Dr. E. Martin Freund, 762 Madison Avenue, Albany 3, N. Y.
Time and Place: 8 p.m., first Thursday of month, October to June. Albany, Troy, Schenectady, rotating monthly

FORT WORTH EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. W. H. McKenzie
Secretary: Dr. C. Keith Barnes, 921 Neil P. Anderson Building, Fort Worth 2, Texas
Time and Place: 6:30 p.m., first Friday of each month, except July and August. All Saints' Hospital

HOUSTON ACADEMY OF MEDICINE, OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SECTION
President: Dr. Lyle Hooker
Secretary: Dr. Claude C. Cody, III, 1304 Walker Avenue, Houston 2, Texas
Time: Second Thursday of each month, October through June

INDIANAPOLIS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY
President: Dr. Alan L. Sparks
Secretary-Treasurer: Dr. J. Lawrence Sims, 809 Hume Mansur Building, Indianapolis 4, Ind.
Time and Place: 6:30 p.m., second Thursday of each month, November to May. Indianapolis Athletic Club

KANSAS CITY SOCIETY OF O. O. R. L.
President: Dr. John McLeod
Secretary: Dr. James W. May, 1016 Rialto Building, Kansas City, Mo.
Time and Place: Third Thursday of the month, November through May. Hotel President, 14th and Baltimore

LONG BEACH EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. Edmund D. Godwin
Secretary: Dr. James V. Keipp, 110 Pine Avenue, Long Beach 2, Calif.
Time and Place: 6:00 p.m., monthly, September through May. Seaside Memorial Hospital

LOS ANGELES OPHTHALMOLOGICAL SOCIETY
President: Dr. Deane C. Hartman
Secretary: Dr. Daniel B. Esterly, 104 North Madison Avenue, Pasadena 1, Calif.
Time and Place: First Thursday of each month, September through June. Los Angeles County Medical Society Building, 1925 Wilshire Boulevard

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Alden H. Miller
Secretary: Dr. Victor Goodhill, 2007 Wilshire Boulevard, Los Angeles 5, Calif.
Time and Place: 6:00 p.m., fourth Monday of each month, September through May. Los Angeles County Medical Association Building, 1925 Wilshire Boulevard

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA, SECTION ON OTOLARYNGOLOGY
President: Dr. Victor Alfaro
Secretary: Dr. Frasier Williams, 1228 North Irving Street, Arlington, Va.
Time and Place: 7:00 p.m., third Tuesday in October, November, March and May. Army and Navy Club, 17th and Farragut Square, N.W.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
Chairman: Each member, in alphabetical order
Secretary: Dr. Sam H. Sanders, 1089 Madison Avenue, Memphis, Tenn.
Time and Place: Second Tuesday in each month, September through May. Memphis Eye, Ear, Nose and Throat Hospital

MILWAUKEE OTO-OPHTHALMIC SOCIETY
President: Dr. J. P. Wild
Secretary-Treasurer: Dr. Howard High, 324 East Wisconsin Avenue, Milwaukee 2, Wis.
Time and Place: 6:30 p.m., fourth Tuesday of each month, October to May. Athletic Club

MONTGOMERY COUNTY MEDICAL SOCIETY, SECTION ON EYE, EAR, NOSE AND THROAT
President: Dr. Robert A. Bruce
Secretary-Treasurer: Dr. L. N. Shroder, 144 West Fourth Street, Greenville, Ohio
Time and Place: First Tuesday of November, February, March and May. Dayton Country Club

MONTREAL OPHTHALMOLOGICAL SOCIETY
President: Dr. Jules Brahy
Secretary-Treasurer: Dr. Leo S. S. Kirschberg, 1390 Sherbrooke Street, West, Montreal, Que., Canada
Time: Second Thursday of October, December, February and April

NEW YORK ACADEMY OF MEDICINE, SECTION ON OPHTHALMOLOGY
Chairman: Dr. Milton L. Berliner
Secretary: Dr. John M. McLean, 525 East 68th Street, New York 21, N. Y.
Time and Place: Third Monday of the month, October through May. New York Academy of Medicine

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY
President: Dr. Samuel Gartner
Secretary: Dr. Leon H. Ehrlich, 211 Central Park West, New York 24, N. Y.
Time and Place: First Monday of the month, October to May. New York Academy of Medicine

NUECES COUNTY EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. C. N. Meador
Secretary: Dr. Rex C. House, 228 Medical-Dental Building, Corpus Christi, Texas
Time and Place: 7:30 p.m., second Monday of each month, October through May. Dusty's, 1739 South Brownlee Street, Corpus Christi, Texas

OKLAHOMA CITY ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. C. W. McClure
Secretary: Dr. Richard A. Clay, 416 Northwest 13th Street, Oklahoma City, Okla.
Time and Place: First Tuesday of each month. University Hospital, 800 Northeast 13th Street, Oklahoma City

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY
President: Dr. Thomas T. Smith
Secretary-Treasurer: Dr. G. T. Alliband, 1020 Medical Arts Building, Omaha, Neb.
Time and Place: Dinner meeting third Wednesday monthly, October to May. Omaha Club

PHILADELPHIA COUNTY MEDICAL SOCIETY, EYE SECTION
Chairman: Dr. Alfred Cowan
Secretary: Dr. John W. Deichler, 301 South 21st Street, Philadelphia 3, Pa.
Time: First Thursday of each month, November through April

PHILADELPHIA LARYNGOLOGICAL SOCIETY
President: Dr. Thomas F. Furlong, Jr.
Secretary: Dr. John J. O'Keefe, 255 South 17th Street, Philadelphia 3, Pa.

PITTSBURGH ACADEMY OF MEDICINE
President: Dr. John S. Plumer
Secretary: Dr. Samuel D. Evans, 1501-2 Park Building, Pittsburgh 22, Pa.
Time and Place: 8:00 p.m., fourth Monday of each month, October through May. Pittsburgh Academy, 322 North Craig Street

PITTSBURGH OTOLOGICAL SOCIETY
President: Dr. Daniel S. DeStio
Secretary: Dr. George C. Schein, 634 Washington Road, Pittsburgh, Pa.
Time and Place: Bimonthly. Pittsburgh

PUGET SOUND ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY
President: Dr. Frank H. Wanamaker
Secretary-Treasurer: Dr. Willard F. Goff, 432 Stimson Building, 1215 Fourth Avenue, Seattle 1, Wash.
Time and Place: Third Tuesday of each month. Medical-Dental Building, Seattle

READING EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. William J. Hertz
Secretary: Dr. Paul C. Craig, 232 North Fifth Street, Reading, Pa.
Time and Place: Third Wednesday of each month, September to July (dinner meetings). Wyomissing Club

RICHMOND, VIRGINIA, EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. E. W. Perkins
Secretary-Treasurer: Dr. J. Warren Montague, 1001 West Franklin Street, Richmond 20, Va.
Time and Place: First Tuesday of January, March, May and October. Commonwealth Club

ST. LOUIS COUNTY MEDICAL SOCIETY, SECTION ON EYE, EAR, NOSE AND THROAT
Chairman: Dr. Anderson C. Hilding
Secretary: Dr. James P. Tetlie, 626 Medical Arts Building, Duluth, Minn.
Time and Place: 6:00 to 8:00 p.m., preceding the monthly St. Louis County Medical Society meeting. St. Mary's Hospital, Duluth

ST. LOUIS OPHTHALMIC SOCIETY
President: Dr. Lawrence T. Post
Secretary: Dr. James H. Bryan, 330-332 Beaumont Medical Building, St. Louis 8, Mo.
Time and Place: 8:00 p.m., fourth Friday of each month, October through April, except December. Elliott Auditorium, McMillan Hospital

SAN FRANCISCO COUNTY MEDICAL SOCIETY, SECTION ON EYE, EAR, NOSE AND THROAT
Chairman: Dr. W. E. Borley, 655 Sutter Street, San Francisco, Calif.
Secretary: None
Time and Place: Fourth Tuesday of each month, except July, August and December. San Francisco County Medical Society Building

SPOKANE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY
President: Dr. Phil Greene
Secretary: Dr. Cornelius E. Hagan, Jr., 508 Old National Bank Building, Spokane, Wash.
Time and Place: Fourth Tuesday of each month, September through May. Paulsen Medical and Dental Building

SUPERIOR CALIFORNIA EYE CLUB
President: Dr. Theodore Holstein, 523 Medico-Dental Building, Sacramento 14, Calif.
Secretary: Dr. John Berg
Time: Every third Thursday, eight months of the year

TORONTO ACADEMY OF MEDICINE, SECTION OF OPHTHALMOLOGY
Chairman: Dr. A. Lloyd Morgan
Secretary: Dr. Joseph C. Hill, 174 St. George Street, Toronto 5, Ontario, Canada
Time and Place: Second Monday night of November, January, February and March. Academy of Medicine, Toronto

WASHINGTON, D. C. OPHTHALMOLOGICAL SOCIETY
President: Dr. J. Thomas Schnebly
Secretary-Treasurer: Dr. E. S. Caldemeyer, 1826 R Street, N.W., Washington 9, D. C.
Time and Place: Bimonthly, October through May. Kennedy-Warren Hotel

WESTERN PENNSYLVANIA EYE, EAR, NOSE AND THROAT SOCIETY
President: Dr. C. E. Imbrie
Secretary-Treasurer: Dr. F. E. Murdock, 28½ West Scribner Avenue, DuBois, Pa.
Time: Biannually. Third Thursdays of May and October

WILKES-BARRE OPHTHALMOLOGICAL SOCIETY
President: Dr. Vincent Gallizzi
Secretary: Dr. Samuel T. Buckman, 70 South Franklin Street, Wilkes-Barre, Pa.
Time and Place: Last Tuesday of each month, October through May, except December. Luzerne County Medical Society Library, 130 South Franklin Street

HEARING AIDS ACCEPTED BY THE COUNCIL ON PHYSICAL MEDICINE AND REHABILITATION THE AMERICAN MEDICAL ASSOCIATION

As of October 1, 1950

Aurex Model F ..... JAMA 138:294 (Sept. 25) 1948
Aurex Model H ..... JAMA 136:1099 (April 24) 1948

MFR. AUREX CORP.
1117 N. Franklin St., Chicago 10, Ill.

Beltone Mono-Pac ..... JAMA 130:637 (March 9) 1946
Beltone Harmony Mono-Pac ..... JAMA 133:543 (Feb. 22) 1947
Beltone Symphonette ..... JAMA 140:1217 (Aug. 13) 1949
Beltone Mono-Pac Model M ..... Report not yet published

MFR. BELTONE HEARING AID CO.
1450 W. Nineteenth St., Chicago 8, Ill.

Cleartone Model 500 ..... JAMA 144:103 (Sept. 9) 1950
Cleartone Regency Model ..... JAMA 144:103 (Sept. 9) 1950

MFR. AMERICAN SOUND PRODUCTS, INC.
2454 S. Michigan Ave., Chicago 16, Ill.

Dysonic Model No. 1 ..... JAMA 137:1534 (Aug. 21) 1948

MFR. DYNAMIC HEARING AIDS, INC.
1042 Atlantic Ave., Brooklyn 16, N. Y.

Electroear Model C ..... JAMA 136:769 (March 13) 1948

MFR. AMERICAN EARPHONE CO., INC.
10 E. Forty-third St., New York 17, N. Y.

Gem Model V-35 ..... JAMA 139:229 (Jan. 22) 1949
Gem Model V-60 ..... Report not yet published

MFR. GEM EAR PHONE CO., INC.
50 W. Twenty-ninth St., New York 1, N. Y.

Maico Atomeer ..... JAMA 133:542 (Feb. 22) 1947
Maico UE Atomeer ..... JAMA 143:1069 (July 22) 1950
Maico Quiet Ear Models G & H ..... Report not yet published

MFR. MAICO CO., INC.
21 N. Third St., Minneapolis 1, Minn.

Mears Aurophone Model 200 ..... JAMA 138:428 (Oct. 9) 1948
1947-Mears Aurophone Model 98 ..... JAMA 137:1535 (Aug. 21) 1948

MFR. MEARS RADIO HEARING DEVICE CORP.
1 W. Thirty-fourth St., New York 1, N. Y.

Micronic Model 101 (Magnetic Receiver) ..... JAMA 139:99 (Jan. 8) 1949
Micronic Model 303 ..... JAMA 142:1363 (April 29) 1950

MFR. MICRONIC CO.
727 Atlantic Ave., Boston 11, Mass.

Microtone T-3 Audiomatic ..... JAMA 138:1229 (Dec. 25) 1948
Microtone T-4 Audiomatic ..... JAMA 136:109 (Jan. 10) 1948
Microtone T-5 Audiomatic ..... JAMA 139:379 (Feb. 5) 1949
Microtone Classic Model T9 ..... Report not yet published
Microtone Model 45 ..... Report not yet published

MFR. MICROTONE CO.
Ford Parkway on Mississippi, St. Paul 1, Minn.

National Cub Model (C) ..... JAMA 138:295 (Sept. 25) 1948
National Standard Model (T) ..... JAMA 138:295 (Sept. 25) 1948
National Star Model (S) ..... JAMA 138:295 (Sept. 25) 1948
National Ultrathin Model 504 ..... Report not yet published
National Vanity Model 506 ..... Report not yet published

MFR. NATIONAL HEARING AID LABORATORIES
815 S. Hill St., Los Angeles 14, Calif.

Otarion, Model E-1 ..... JAMA 136:108 (Jan. 10) 1948
Otarion, Model E-1S ..... JAMA 138:650 (Oct. 30) 1948
Otarion, Model E-2 ..... JAMA 138:887 (Nov. 20) 1948
Otarion, Model E-4 ..... JAMA 140:156 (May 14) 1949
Otarion, Models F-1 & F-2 ..... Report not yet published

MFR. OTARION, INC.
159 N. Dearborn St., Chicago 1, Ill.

Paravox Models VH and VL (Standard) ..... JAMA 132:79 (Sept. 14) 1946
Paravox Model XT (Extra-Thin) ..... JAMA 134:365 (May 24) 1947
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Paravox Model Y (Y, YC & YC 7) (Very small) ..... JAMA 140:155 (May 14) 1949

MFR. PARAVOX, INC.
2056 E. Fourth St., Cleveland 15, Ohio

Radioear Permo-Magnetic Uniphone ..... JAMA 139:787 (March 19) 1949
Radioear Permo-Magnetic Multipower ..... JAMA 140:959 (July 16) 1949
Radioear All-Magnetic Model 55 ..... JAMA 143:555 (June 10) 1950
Radioear Model 62 Starlet ..... Report not yet published

MFR. E. A. MYERS & SONS
306-08 Beverly Road, Mt. Lebanon, Pittsburgh 16, Pa.

Silver Micronic (Magnetic and Crystal) Models
202M & 202C ..... JAMA 139:848 (March 26) 1949
MFR. MICRONIC CO.
727 Atlantic Ave., Boston 11, Mass.

Silvertone Model 103BM ..... JAMA 142:815 (March 18) 1950
MFG. NATIONAL HEARING AID LABORATORIES
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DISTR. SEARS, ROEBUCK & CO.
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Silvertone Model M-35 ..... Report not yet published
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MFR. W. E. JOHNSON MFG. CO.
708 W. 40th St., Minneapolis, Minn.
DISTR. SEARS, ROEBUCK & CO.
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Solo-Pak Model 99 ..... JAMA 144:315 (Sept. 23) 1950
MFR. SOLO-PAK ELECTRONICS CORP.
Linden St., Reading, Mass.

Sonotone Model 600 ..... JAMA 131:523 (June 8) 1946
Sonotone Model 700 ..... JAMA 135:838 (Nov. 29) 1947
Sonotone Model 900 ..... JAMA 139:786 (March 19) 1949
Sonotone Models 910 and 920 ..... JAMA 142:815 (March 18) 1950
Sonotone Model 925 ..... JAMA 144:315 (Sept. 23) 1950
MFR. SONOTONE CORP.
Box 112, Elmsford, N. Y.

Super-Fonic Hearing Aid ..... JAMA 138:293 (Sept. 25) 1948
MFR. AMERICAN SOUND PRODUCTS, INC.
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Televox Model E ..... JAMA 140:783 (July 2) 1949
MFR. TELEVOX MFG. CO.
1307 Sansom St., Philadelphia 7, Pa.

Telex Model 22 ..... JAMA 134:605 (June 14) 1947
Telex Model 97 ..... JAMA 138:294 (Sept. 25) 1948
Telex Model 99 ..... JAMA 141:1153 (Dec. 17) 1949
Telex Model 200 ..... JAMA 144:103 (Sept. 9) 1950
Telex Model 1700 ..... JAMA 141:1057 (Dec. 10) 1949
MFR. TELEX, INC.
Telex Park, Minneapolis 1, Minn.

Tonemaster Model Royal ..... JAMA 139:848 (March 26) 1949
MFR. TONEMASTER, INC.
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Trimm Vacuum Tube Model 300 ..... JAMA 133:542 (Feb. 22) 1947
MFR. TRIMM DISTRIBUTORS, INC.
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Unex Model A ..... JAMA 134:254 (May 17) 1947
Unex Midget Models, 95 & 110 ..... JAMA 141:134 (Sept. 10) 1949
MFR. NICHOLS & CLARK
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Vacolite Model J ..... JAMA 140:782 (July 2) 1949
MFG. VACOLITE CO.
3003 N. Henderson St., Dallas 6, Texas

Western Electric Model 63 ..... JAMA 131:895 (July 13) 1946
Western Electric Model 64 ..... JAMA 134:605 (June 14) 1947
Western Electric Models 65 & 66 ..... JAMA 137:534 (June 5) 1948
MFR. WESTERN ELECTRIC CO., INC.
120 Broadway, New York 5, N. Y.

Zenith Model 75 ..... JAMA 135:773 (Nov. 22) 1947
Zenith Miniature 75 ..... JAMA 143:440 (June 3) 1950
MFR. ZENITH RADIO CORP.
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Accepted hearing aids more than five years old have been omitted from this list for brevity

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Aurex (Semi-Portable) ..... JAMA 109:585 (Aug. 21) 1937
MFR. AUREX CORP.
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Precision Table Hearing Aid ..... JAMA 139:785 (March 19) 1949
MFR. PRECISION ELECTRONICS CO.
5157 W. Grand Ave., Chicago 39, Ill.

Sonotone Professional Table Set, Model 50 ..... JAMA 141:658 (Nov.5) 1949.
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E., E., N., & T. Mo., 26:27, 1947.
Laryngoscope, 56:556, 1946.
New Eng. J. Med., 234:468, 1946.
Annals of Allergy, 4:33, 1946.
J. A. Ph., A., (Sc. Ed.) 35:304, 1946.

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